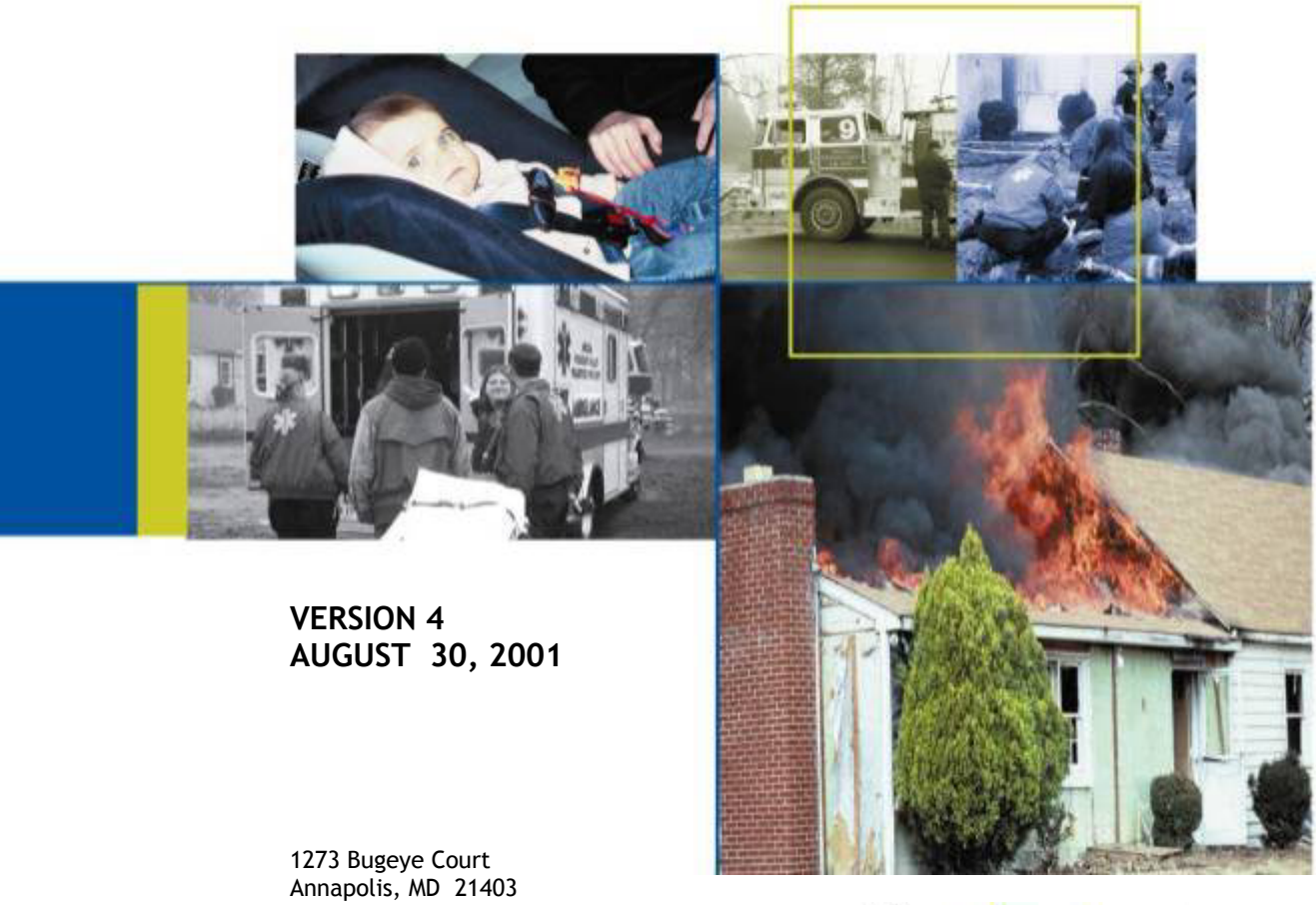
A MODEL FIRE/EMS AND EMERGENCY MANAGEMENT SYSTEM FOR LOUDOUN COUNTY, VIRGINIA

TASK TWO: SERVICE LEVELS



VERSION 4
AUGUST 30, 2001

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Table of Contents

1. EXECUTIVE SUMMARY

Loudoun County is the third fastest growing county in the United States. This presents unique challenges to systems planners, especially since most of the growth is occurring in the eastern portions of the County, leaving the western portions pristine, historically significant and predominantly rural. Although the rapid growth of Loudoun County is projected to steadily migrate to western portions of the County over the next few years, that migration has just begun. Thus, while western Loudoun County is still very rural, it is changing rapidly. This rural nature limits the availability of financial and human resources to meet increased demand for many types of services, including emergency services. Additionally, changes in expectation for services and a decrease in volunteerism have placed more stress on the current emergency response systems.

The Loudoun County Board of Supervisors, recognizing the rapidly changing environment issued a request for services to hire a consultant to develop a model Fire/EMS and Emergency Management Plan for Loudoun County. The EMSSTAR Group, LLC (EMSSTAR) was awarded this contract on October 27, 2000. EMSSTAR completed Task One: The Model, on May 6, 2001. After many public meeting to discuss the Model, and after several meetings of the Finance and Government Service Subcommittee of the Loudoun County Board of Supervisors, the Board voted to continue the project until all tasks were completed. The remaining tasks are, Develop Service Levels, Benchmark The County System, and Develop an Implementation Plan. Following completion of these tasks, the Board will reconvene and determine whether it will adopt the Model, Service Levels, and Benchmarking for implementation throughout the County. If the Model is adopted, the final task will be to develop a Service Plan.

In developing the model, EMSSTAR utilized over 20 assumptions based on data, interviews, history and tradition, system demands, growth predictions and various other indicators. Once the Model had been developed, The EMSSTAR Group developed three service levels, high, average and minimum as specified in the contract from the County, for consideration for each of the seventeen attributes of the Model. Additionally, EMSSTAR recommended a service level that it believes to be appropriate for the County for each of the seventeen attributes. EMSSTAR recognize that the cost implications of a high service level may be beyond current fiscal capabilities. EMSSTAR has therefore utilized a phased in approach to several recommended service levels giving the County the ability to fiscally plan for full implementation of the recommended service level within an appropriate time frame.

This document represents task two of the contract. It is a companion document to Task One: The Model and must be used in conjunction with that document. The reader should refer to the model for detailed information regarding such areas as background, assumptions, etc.

2. SERVICE LEVELS

2.1. THE DESIGN PROCESS

EMSSTAR used the expert panel approach to problem solving in developing the model service levels and in doing so used the same team of national experts that developed *Task One: The Model*. Once the Model had been developed, The EMSSTAR Group developed three service levels, high, average and minimum, for consideration for each of the seventeen attributes. Additionally, EMSSTAR recommended a service level for each attribute that the team believes to be appropriate for the County.

In developing the service levels EMSSTAR used the following definitions:

HIGH: The level of capability or service for Loudoun County based on the EMSSTAR team's perspective of best practice representing a gold standard within fire, EMS and emergency management throughout the Unites States.

AVERAGE: The level of capability or service that represents a standard that will adequately serve the citizens of the County, clearly above the MINIMUM level, but clearly below the HIGH level.

MINIMUM: The level of capability or service that represents the minimum level acceptable to ensure the safety and health to the consumer of that service.

Additionally each service level includes a "Financial Implications" discussion. The figures are not intended to be hard costs or precise figures but offer a general discussion about the cost of each service level. These "Financial Implications" discussions include both start-up and ongoing costs that must be considered when determining short and long costs. Precise costing may be dependent on specific engineering studies, bid offerings, competitive pricing, in-kind services, agency sharing, County purchase rates, quality of service or product, etc.

Finally, EMSSTAR provides a recommendation and rationale for the service level it believes to be most appropriate for implementation. Although these decisions are most often financial, EMSSTAR has made these recommendations based on the principal that the County is developing a "model" system for the future that is cost effective and provides quality emergency services.

Each of the following attributes corresponds numerically 1-17 to the Attribute found in the *Task One: The Model* Document.

3. MODEL PLAN ATTRIBUTE SERVICE LEVELS

The following is a discussion of three service levels, "High", "Average" and "Minimum" for each of the seventeen attributes discussed in the companion document *Task One: The Model*. Financial implications are discussed for each service level. EMSSTAR then offers a recommendation for implementation, accompanied by its rationale for that recommendation.

3.1. REGULATION AND POLICY SERVICE LEVELS

This attribute provides for the administrative and promulgated authority to plan, implement, and monitor the performance of the emergency medical, fire, rescue, and emergency management services provided within the jurisdiction. It establishes the legal basis and requirements for service provision and the oversight thereof, to include definition of the extent to which the governing authority may act on behalf of the public interest in the event of a compromise to the availability and quality of any system component. The jurisdiction's ability and specific powers to offer emergency response and emergency management are articulated in appropriate mechanisms (i.e., ordinances and district rulings) and the conformity of services offered to all applicable Commonwealth laws and rules are assured.

3.1.1. HIGH

There is a single department for fire/EMS and emergency management in the County. The Department includes all existing volunteer fire and rescue companies and all career personnel. There is a single Chief that has overall authority and responsibility for the provision of fire, EMS and emergency management services.

The Department has established one district encompassing the entire County and a comprehensive fire protection plan and ordinance that addresses the legal basis for providing fire and EMS, including the franchising or permit issuance for private non-emergency transportation services, the fee structure for any services operating within its jurisdiction, proposed resolutions pertaining to the operation of EMS agencies within the County, and all applicable operational parameters dictated as the County's prerogative under the relevant chapters of Virginia law and administrative code. The ordinance furthermore specifies the responsible party and methods of compliance required of all organizations (the Department and any others permitted or awarded a franchise) with the VA Motor Vehicle Code, including insurance requirements, the Drug Control Act, and child labor laws.

The Department, on behalf of the County, will apply for and maintain a single license from the Commonwealth embodying all EMS operations, including vehicles and personnel.

There is a Fire, Rescue, and Emergency Services Advisory Commission appointed by the Board of Supervisors that includes one citizen, two volunteer fire chiefs, two volunteer rescue chiefs, one career fire fighter and the system medical director. A member of the Board of Supervisors and the Chief actively participate as non-voting members. The Chief monitors and assures compliance of all operational components of the system with appropriate Commonwealth and local fire code, and compatibility with the Commonwealth EMS plan and Commonwealth EMS communications plan. The Commission is utilized for recommendations to the Chief on new initiatives, policies, protocols, response strategies, sophisticated challenges and other appropriate issues under its domain as defined by a charter approved by the Board of Supervisors.

The Advisory Commission assists the Chief in determining the method of executing the County's appointing authority role in submitting three persons and an alternate to be representatives to the Northern Virginia EMS Council and determining the length of office for each. All travel to and participation in the regional council quarterly and annual meeting is supported and funded by the County.

The Chief or his designee assures that responsibilities of disaster planning, disaster response and recovery are executed and integrated with the Commonwealth emergency management system.

A full time Medical Director provides off line medical control and oversight for all EMS services in the County, and arranges and monitors a system of on line medical direction for EMS providers to engage during direct patient care activities.

3.1.1.1. FINANCIAL IMPLICATIONS

Commission Administrative Support $38,000

Travel and Per Diem for Northern VA EMS Council Appointees $500

Deputy Chief for Compliance – Licensure, Permits, Plans

and Regulatory Assurances $82,,000

Full Time Medical Director $180,000

3.1.2. AVERAGE

The County Board of Supervisors formally provides administrative leadership and direct logistical support of the fire, EMS, and rescue stations in Loudoun County through the establishment and on-going fiscal support of a Loudoun County Fire and Rescue Department (Department). The Chief of Fire and Rescue and the fire and rescue companies, through collaborative relationships with the existing organizations within the jurisdiction, operate under a contemporary plan, the content of which is grounded in the County-wide district established under 16834 Virginia Code § 27-23.1 and the provisions of a comprehensive EMS ordinance created in conformity with Virginia Code § 32.1-111.14.

There is a County Fire and Rescue Advisory Commission (Commission) appointed by the Board of Supervisors that includes the Chief and the medical director, both of which are non-voting; one citizen representing the interests of the people and property protected by the system; one town mayor; one individual for each of the following groups of organizations, representing the unique interests of each: volunteer fire departments operating ambulance services, volunteer fire departments with a non-transporting EMS role, volunteer fire departments with no EMS role, volunteer rescue squads, and private ambulance services (if applicable); and one representative from each of the Board of Supervisors' districts who have no background in emergency services nor be affiliated with any emergency service organization.

The Commission shall meet at least quarterly to reach consensus on operating guidelines, including staffing and response criteria; criteria for volunteer stations to request career augmentation to manpower resources; definitions of response times and capabilities as benchmarks for volunteer organizations; methods of providing advanced life support (ALS) coverage, including ALS first response if appropriate; identification of opportunities for improvement through the County communications center, including priority and emergency medical dispatch considerations; prioritization of use of County resources for training, recruitment, and retention programs; definition for the process by which volunteer organizations can voluntarily convert any equipment or buildings to County ownership; adoption of medical protocols as proposed by the medical director, and approaches and content for grants from the Virginia Rescue Squads Assistance Fund and other Commonwealth and federal resources. Any uniform standards (e.g., turnout time) that are developed contain rural modifiers where appropriate.

The Commission has a formal method for approach by individuals or organizations that wish to bring issues forward for the Commission's consideration. The County will provide support staff to facilitate record keeping and the taking of minutes. The deliberations and findings of the Commission shall be provided via formal written report to the County Administrator. Where the recommendations of the Commission warrant action or approval of the Board of Supervisors, or are suggesting change to any existing policy or mandate of the Board of Supervisors, such as the EMS Ordinance, the Commission is represented at the Supervisors meeting. Any agency unwilling to adhere to Commission standards would have to defend its decision to its own governing entity and local elected officials. The Commission is distinct from any prior body bearing the same name as a result of this direct reporting relationship and the delegated presence of the Board of Supervisors.

Where enabled by the EMS ordinance and fire district requirements, the Commission would recommend to the Chief of Fire and Rescue minimum performance standards and the associated method of documentation and accountability. If local agencies are unable to meet or exceed the performance standard, the County has an objective basis to determine what resource deployment it can provide or action it might take, to ensure adherence to the standard.

County-acquired assets and career personnel would be the direct responsibility of the Chief. The Chief and local agency officers would collaborate frequently on technical matters, mutual aid arrangements, and disaster exercises career and volunteer staff would have a contemporary understanding of the integrated role of the officers from each of the agencies with which they routinely respond. The Department role continues to evolve into one of system support and stewardship, including the provision of critical infrastructure services through the County to volunteer agencies, such as billing services, access to legal counsel, and instruction in quality improvement processes. Local fire and

rescue companies preserve their role as the foundation of the emergency response system, while the Department and resources assure consistency and continuity of response and patient care common to all.

The Commission determines the method of executing the County's appointing authority role in submitting three persons and an alternate to be representatives to the Northern Virginia EMS Council and determining the length of office for each. All travel to and participation in the regional council quarterly and annual meeting is supported and funded by the County. The Commission also serves the County by recommending individuals to participate in multidisciplinary projects affecting the County or region, such as Intelligent Transportation Systems initiatives of the Virginia Department of Transportation.

A Medical Director is hired or contracted to provide off line medical direction on a part time basis. This individual serves all agencies within the County, attends all Commission meetings, and interacts with the chief administrative official of each of the respective agencies with any EMS role.

3.1.2.1. FINANCIAL IMPLICATIONS

Commission Administrative Support $38,000

Travel and Per Diem for Northern VA EMS Council Appointees $500

Part Time Medical Director $40,000

3.1.3. MINIMUM

The County Board of Supervisors formally provides administration of career personnel and direct logistical support of the fire, EMS, and rescue stations in Loudoun County through the on-going fiscal support of the Loudoun County Fire and Rescue Department. The Department and its Chief, through cooperative relationships with the existing organizations within the jurisdiction, augments volunteer manpower resources on an as-needed basis. The EMS and Fire Councils are folded into the Fire and Rescue Commission as a single entity, through which all Commonwealth funds are distributed. The Commission serves as a sounding board for concerned fire and rescue agencies in an advisory capacity to the Chief.

An EMS ordinance is in place that addresses private non-emergency transport and does not define fee structures or other EMS operational parameters.

A volunteer medical director assists the Department and acts as the medical authority for career personnel. Other physicians may assist other agencies where possible.

Each agency, including the Department, holds its own EMS license from the Commonwealth. No County level prioritization of requests for funds or grants from Commonwealth and federal agencies is performed. Efficiency in administrative decision-making about availability and seat allocation for training is not assessed.

3.1.3.1. FINANCIAL IMPLICATIONS

No change from current levels.

3.1.4. RECOMMENDATION FOR REGULATION AND POLICY SERVICE LEVEL

EMSSTAR recommends: "**Phased in approach to High"**

Rationale:

Dating back to the Emergency Medical Services Systems Act of 1973, and through to contemporary expert position papers and publications of organizations such as the National Highway Traffic Safety Administration, the National Association of EMS Physicians, the American College of Emergency Physicians, and the National Association of State EMS Directors, system regulation and centralized coordination of emergency response have been articulated as a necessary and desirable attribute of any high performance emergency medical system. An established and common approach in the Commonwealth of Virginia and many other states is a countywide all hazard department, typically fire department based and oriented.

Virginia Law acknowledges both the importance of centralized coordination though its fire district (16834 Virginia Code § 27-23.1 and EMS law (Virginia Code § 32.1-111.14) and related funding and compliance issues. The "high" service level attribute described above is indicative of a well exercised, highly seasoned fire/rescue organization where the day to day operational issues are resolved and standardized yet is continually improving under the vision and leadership of the Board of Supervisors through its Chief. A phased in approach to the high level of service is recommended for Loudoun County's consideration given the complex challenges the critical fire and rescue organizations are facing, both internally and externally.

It is unlikely that any system, even one desirous of significant improvement, can make a quantum leap change in short order; to that end, a phased approach to moving to a high level of service offers the best opportunity for success. During the transition period to the high level of service each Board of Supervisors member should consider the appointment of one additional member to the Advisory Commission from each magisterial district. These additional appointments should have no background in emergency services nor be affiliated with any emergency service organization. While this will significantly increase the voting members of the Commission the expansion of the Advisory Commission members will help ensure broad representation and increase the level of trust necessary to bridge to the future. The Commission should be intimately involved in making recommendations for

performance standards, policy changes, response times, rural modifiers, staffing requirements, training, etc. in order to ensure an orderly transition to the high level of service. Active participation by the Chief and the Board of Supervisors representative to the Commission is critical during this phase of transition.

3.2. RESOURCE MANAGEMENT SERVICE LEVELS

This attribute represents an internal tool for the County and the Department to achieve a balance of expected response/performance standards, with the human and equipment resources necessary to meet those standards. A resource management plan for Loudoun County allows the Board of Supervisors, the Department, and ultimately the taxpayers to identify what resources are necessary to meet the defined emergency response needs of today as well as predict what resources will be necessary for anticipated future growth. An effective resource management program includes an inventory of existing resources in the County for fire/EMS/emergency management response and a plan that describes current deployment, utilization, and maintenance of resources along with a schedule for acquiring future resources based on need. The plan must also include a disaster/service recovery component that describes how to reestablish the system in the event of short-term failure (first 24 hours) and also how to manage longer-term failures (greater than 24 hours) while maintaining the integrity of the system. The goal of resource management is to match the necessary resources with the desired level.

3.2.1. HIGH

An automated, centralized, inventory of resources is maintained for the County's single Department. This inventory includes the location and description of all fire/EMS/emergency management facilities (including water supply), durable equipment, vehicles, and personnel. For facilities, vehicles, and equipment, the inventory includes descriptive information about age, condition, and expected service life. For personnel, the descriptive inventory information should include tenure, rank, training and similar information. Financial information for facilities, vehicles, and equipment such as initial cost, cost of maintenance and repairs, number/type of responses, and time out of service is recorded. For personnel, financial information on wages paid (if any), costs of training, number/type of responses, accrued leave, etc are documented. The development of the resource inventory should be considered as part of the development of a comprehensive data/evaluation system.

The inventory provides the data for a centralized resource management plan that reflects the County's predetermined response standards. The resource management plan specifically identifies which resources the system is committing to meeting the predetermined response standards. Compliance with response standards is reviewed on a periodic basis with the resource inventory to identify current and future needs, manage existing resources to best match needs, and support planning for future resource acquisition. Effective resource management is heavily dependent upon a functioning data/information system that can monitor and document the status and experience with resources in the system on an ongoing basis. Responsibility for developing and maintaining the resource management plan resides with the Chief of the Department.

The inventory system and resource plan has a detailed disaster/service recovery component that spells out exactly the steps to recovery. As required, agreements with vendors are in place that outline their part in the recovery process.

3.2.1.1. FINANCIAL IMPLICATIONS

Information and demand management systems staff support for 1.0 FTE $80,000

Information systems Data entry Staff .5 FTE $20,000

Computer System with Software .....$10,000 Capital Cost

The direct costs of establishing and maintaining a resource inventory and resource management plan are largely included in expenditures for the comprehensive data/evaluation system, the communications system, and the personnel costs of a Chief. It may be reasonable to assign a full time information systems staff member to support the development and maintenance of the resource management plan.

3.2.2. AVERAGE

An automated, centralized, inventory of resources is maintained for the County's single Department. This inventory includes the location and a description of all fire/EMS/emergency management facilities (including water supply), durable equipment, vehicles, and personnel. A minimum number of descriptive and financial data elements are included in the inventory.

The inventory is one component of a centralized resource management plan that includes the County's predetermined response standards. The resource management plan specifically identifies which resources the system is committing to meeting the predetermined response standards. The primary purpose of the resource management plan is in the support of day-to-day operations rather than long term planning. Responsibility for developing and maintaining the resource management plan resides with the Chief of the Department.

3.2.2.1. FINANCIAL IMPLICATIONS

Information systems staff support for .50 FTE $40,000

Data Entry Staff .5 FTE $20,000

The direct costs of establishing and maintaining modest resource inventory and resource management plans are mostly included in expenditures to support the data/evaluation system, the communications system, and the personnel costs of a Chief. It may be reasonable to assign a portion of the time of an information systems staff member to support the development and maintenance of the resource management plan.

3.2.3. MINIMUM

A partially automated, de-centralized, inventory of resources is maintained at the local company level and compiled at the County level. This inventory includes the location and a description of all fire/EMS/emergency management facilities (including water supply), durable equipment, vehicles, and personnel. A standard data set is defined and used by all companies to assemble a minimum number of descriptive and financial data elements that comprise the inventory.

The inventory is one component of a centralized resource management plan that includes the County's predetermined response standards. The resource management plan specifically identifies which resources the system is committing to meeting the predetermined response standards. The primary purpose of the resource management plan is in the support of day-to-day operations rather than long term planning. Responsibility for developing and maintaining the resource management plan resides with the Chief of the Department.

3.2.3.1. FINANCIAL IMPLICATIONS

Information systems staff support for .25 FTE $20,000

Date Entry Staff .25 FTE $10,000

The direct costs of gathering a modest resource inventory at the local company level would largely be the labor of senior officers at the local level doing the work. The County would bear the costs of assembling the Countywide resource inventory and developing the resource management plan. This approach might have similar costs to the "average" approach to develop initially, but could have higher long term cost implications in terms of time and labor at the local company level. This modeling approach represents a variation from the previous one regarding who is responsible for gathering the basic resource data rather than a model that will likely result in significant cost savings.

3.2.4. RECOMMENDATION FOR RESOURCE MANAGMENT SERVICE LEVEL

EMSSTAR recommends: **"High"**

Rationale:

Resource management planning represents an investment in the efficient and effective use of available resources. Compared to the total costs of operating the system, the financial support necessary to develop and maintain a comprehensive resource management plan is modest. Irrespective of whatever service delivery model the County may ultimately choose, the information that a centralized resource management plan would provide will be useful for both daily operations and long term system development.

3.2.5. VEHICLES AND EQUIPMENT

This section continues to address the Resource Management Attribute. Effective emergency response requires that vehicles be in service and in a condition to withstand the rigors of emergency work. This places a heavy burden on the Departments to assure that all vehicles are in a state of constant readiness, and meet all safety requirements in order to realize an uneventful response under emergency conditions. Emergency response places a tremendous stress on vehicles. The use of technology can lessen the stress on vehicles, however, the ever-increasing complexity of the electrical systems and on-board computers, make routine maintenance a necessity and not a luxury. Further, upon arrival at the scene, the equipment on the vehicles must be in a state of readiness and able to operate under the harshest of conditions. A good resource management plan will allow Loudoun County to maintain a quality fleet of emergency vehicles and state-of-the-art emergency equipment.

3.2.5.1. HIGH

A high level of service can be attained through the constant planning for and procurement of vehicles. A vehicle and equipment replacement plan will be in place that will result in a replacement program for all vehicles and equipment in the emergency fleet. All vehicles must meet the applicable NFPA standards, and GSA-KKK specifications for vehicles. All safety features must be maintained and utilized at all times. Vehicles and emergency equipment are purchased by the County, insured by the County, and maintained by a centralized shop operated or controlled by the County. Repairs are made by mechanics that are certified ASE mechanics and certified as Emergency Vehicle Technicians. Equipment is serviced by personnel that are trained in the many facets of emergency equipment repair such as hydraulic cutters and spreaders, and self-contained breathing apparatus. Adequate vehicles are in place to allow for reserve units that can be put into service to replace vehicles that are out of service for repairs.

A routine maintenance schedule is in place for all vehicles and equipment. Routine testing is performed on engines and transmissions and state-of-the-art computers are used in diagnosing problems with vehicles and equipment.

A standard set of specifications is in place for all vehicle purchases. A team of County personnel and volunteers meet regularly to develop vehicle and equipment specifications, and to review new technology for inclusion into future purchases. Long-term purchase contracts are in place to allow for standardization of vehicles and to gain a better price for bulk vehicle purchases. All vehicles have a standard set of equipment based on the type of vehicle, and individual stations supplement the base equipment with items that are specific to the response district where the vehicle is assigned. All vehicles must pass the annual Commonwealth inspection.

Computerized records are maintained on each vehicle and for every piece of equipment. Vehicles and equipment that are used on a regular basis will be moved to stations or vehicles where the use is lower. This will allow for an increased life expectancy of equipment and place the newest vehicles in high volume response areas.

3.2.5.1.1. FINANCIAL IMPLICATIONS

Vehicles and equipment should be purchased through a systematic and normal replacement plan. Development of this plan should be completed and administered by the Chief of the Department. To reduce the financial burden on the County, it is recommended that vehicles currently in use at stations remain in use until conditions warrant their replacement. Even though the age of the vehicle should not be the only determining factor, it is one that can be easily administered and assures that the technology is updated on a periodic basis. Although local use will dictate more definitive life expectancies, as a guide, the maximum effective life expectancy of vehicles are as follows (Industry experience):

Engines .....12 years

Ladder Trucks .....15 years

Tankers .....20 years

Heavy Rescue .....20 years

Brush Trucks .....20 years

Specialty Units 20 years (this includes vehicles such a light units, attack pumpers, etc.)

Ambulances ..... 5 years (normal chassis), or 10 years (medium duty chassis)

The estimated cost of vehicles is as follows:

Engines ..... $350,000 equipped

Ladder Trucks..... $650,000 equipped

Tankers..... $250,000 equipped

Ambulances..... $100,000 to 160,000 equipped

Heavy Rescue ..... $450,000 equipped

Emergency equipment must be replaced on a normal basis. A replacement plan will minimize the potential for large expenditures in any one year. Therefore, $250,000 annually should be in place for normal equipment replacement and repair.

Repairs to vehicles must also be funded. Funding this cost item is difficult to budget given the wide range of serviceability that vehicles have. Funding can be figured at a cost of $15,000 for each engine, ladder, tanker, heavy rescue, and ambulances. Smaller vehicles such as brush trucks can be operated for approximately $10,000 per year on the average. Insurance cost for each volunteer company is estimated at $25,000 to $40,000 per year.

The total cost of a vehicle replacement plan per year would be estimated at $2.5 million. This is based on replacing the entire fleet over a period of time.

Cost for mechanics and a shop will vary. Based on a staff of five personnel the cost would be approximately $250,000 per year. In addition, adequate space for large vehicle repair will be necessary. No budget figures are provided due to the wide range of possibilities that can be used to meet this requirement. It is felt that Loudoun County could best make this determination. Cost for this service could be reduced through leased space.

3.2.5.2. AVERAGE

An average level of service can be attained through the constant planning for and procurement of vehicles in a planned and orderly fashion. A vehicle and equipment replacement plan will be in place that will result in a replacement program for all selected vehicles and equipment in the emergency fleet. All vehicles must meet the applicable NFPA standards and GSA-KKK specifications for vehicles. All safety features must be maintained and utilized at all times. The County will purchase, insure, and maintain the following vehicles in the fleet: one engine and one tanker per station, one ambulance per station, ladder trucks stationed based on a risk assessment and response time analysis, and identified heavy rescue vehicles.

Repairs and maintenance for County-owned vehicles is completed at a County maintenance shop. Repairs are made by mechanics that are certified ASE mechanics and certified as Emergency Vehicle Technicians. Funding is provided directly to the volunteer companies for repair and maintenance. County maintenance and repair services are made available to volunteer companies, but volunteer companies can utilize other shops if they meet the minimum requirements. Volunteer companies are billed for labor and parts for repairs to volunteer owned vehicles and equipment. The Department must approve each repair shop and repair technicians must meet a minimum level of competency as determined by the Chief of Fire and Rescue.

Equipment is serviced by personnel that are trained in the many facets of emergency equipment repair such as hydraulic cutters and spreaders, and self-contained breathing apparatus. A minimum number of reserve apparatus is available for use while vehicles are out of service for repair and maintenance.

A routine maintenance schedule is in place for all County owned vehicles and equipment. Standard operating procedures specify the frequency of routine maintenance for all emergency vehicles in the County. Routine testing is performed on all County owned vehicles engines and transmissions and state-of-the-art computers are used in diagnosing problems with vehicles and equipment.

A standard set of specifications is in place for all vehicle purchases for County purchased vehicles. Specifications and bid prices are made available to volunteer companies for their use. A team of County personnel and volunteers meet regularly to develop vehicle and equipment specifications, and to review new technology for inclusion into future purchases. Long-term purchase contracts are in place to allow for standardization of vehicles and to gain a better price for bulk vehicle purchases. All County owned vehicles have a standard set of equipment based on the type of vehicle, and individual stations supplement the base equipment with items that are specific to the response district where the vehicle is assigned. Volunteer owned equipment will match the minimum set of equipment list. All vehicles must pass the annual Commonwealth inspection.

Computerized records are maintained on each vehicle and for every piece of equipment. County owned vehicles and equipment that are used on a regular basis will be moved to stations or vehicles where the use is lower. This will allow for an increased life expectancy of equipment and place the newest vehicles in high volume response areas.

3.2.5.2.1. FINANCIAL IMPLICATIONS

The costs for the average level of service are considerably lower than the high level of service. The number of vehicles that the County would be responsible for is small compared to the total number of vehicles in the fleet.

Essentially, the County would have approximately $700,000 to $750,000 invested in equipment at each station. This would equate to one engine, one tanker, and one ambulance. In addition, ladder trucks would be funded at stations strategically located throughout the County.

The number of required mechanics would be reduced to 3 with a resulting total cost of $150,000 for personnel cost. The cost for a maintenance facility would not decrease. The County would be remiss if a new facility did not account for the potential of repairing all emergency vehicles. Thus, the size of the facility should be planned based on the total size of the fleet of emergency vehicles in the County.

The vehicle repair cost will stay essentially the same as the high level of service if the County reimburses the volunteer stations for vehicle maintenance and repair. The total cost of the vehicle replacement plan will be considerably less under this service level. Approximately three engines, two tankers, and three ambulances would need to be purchased each year. When the cost of ladder trucks is amortized over the life of the vehicles, the annual cost of the vehicle replacement plan is approximately $1.9 million.

3.2.5.3. MINIMUM

Under a low level of service, the County will not purchase any vehicles, but will continue to depend on the volunteer stations to provide the necessary equipment. A countywide replacement plan will be in place and the volunteer organizations must ratify the plan. All vehicles must meet the applicable NFPA standards and GSA-KKK specifications for vehicles. All safety features must be maintained and utilized at all times. A vehicle replacement grant program is in place where the County purchases basic emergency vehicles and the ownership is transferred to the respective volunteer agency. The volunteer stations pay for all maintenance and repair cost. The fire and rescue Department develops a standard for preventative maintenance. All stations that utilize career personnel must agree to this standard for any trucks that career personnel use for emergency response. Volunteers purchase any vehicle that is beyond engines, tankers, ladder trucks, and ambulances.

Maintenance and repairs to all vehicles are made at local repair shops located throughout the County. The Department must approve each repair shop and repair technicians must meet a minimum level of

competency as determined by the Chief of Fire and Rescue. All vehicles must pass the annual Commonwealth inspection.

Insurance cost for volunteer organizations are paid for by the County through a reimbursement process. A standard specification for vehicles is developed by the County and made available to the volunteer stations. However, volunteer organizations can choose to develop a set of specifications as long as the specifications are equivalent to the County specifications. Each department determines the necessary equipment for the vehicles.

3.2.5.3.1. FINANCIAL IMPLICATIONS

This level of service has minimum financial impact. Volunteers pay for maintenance and repair costs and the purchase of new vehicles. The grant program for new vehicles can be appropriated according to the ability of the County budget to absorb the expense. The County could decide to do a 50% matching grant program in order to further reduce the impact on the budget. Total recommended cost for this program would be approximately $500,000.

There are no personnel cost for repair personnel.

3.2.5.4. RECOMMENDATION FOR VEHICLES AND EQUIPMENT

EMSSTAR recommends: **"Average"**

Rationale:

Using this methodology allows the County to assure that basic emergency vehicle needs are met in each station, while still allowing the volunteers to buy additional vehicles for their respective response areas. The implementation of a vehicle replacement plan gives the County the ability to plan for major purchases over a period of years. In addition, volunteer stations may want to opt into the replacement program for their stations in order to have matching vehicles when appropriate.

This service level also assures that ladder truck and heavy rescue squads are assigned to appropriate stations based on risk assessment and response time analysis, rather than on the desires of the individual stations.

Certified mechanics assure that vehicles are being maintained and repaired by qualified personnel. The complex systems in place on all emergency vehicles are simply beyond the ability of local repair shops to maintain. Making funds available to the volunteers for them to pay for repairs makes the coordination of the repairs much easier and reduce the possibility that vehicles are not repaired due to a lack of funding. Making the County repair shop available to the volunteer companies' further assists them in making sure qualified personnel repair their vehicles.

This service level continues to give the volunteers control over their respective vehicles, while setting up minimum expected standards for all emergency vehicles in the County.

3.2.6. FIRE AND RESCUE FACILITES

This section continues to address the attribute of Resource Management. Locating and maintaining a fire and rescue facility is one of the most critical investments that the County can make. Proper placement of facilities based on data analysis can result in a tremendous decrease in response times, and provide for the addition of vehicles and personnel to all areas of the County. This section addresses the various options that are available in determining the location of fire and rescue facilities.

3.2.6.1. HIGH

There is a fire and rescue station located such that every improved parcel in the County is located 1.5 miles or less from a station. All stations are located on sites concentric with the current or projected distribution of calls (generally conforming to population densities) with excellent multi-directional highway or arterial access. Each station has sufficient apparatus area, living quarters, office and meeting space, physical fitness area, and other desired spaces to meet the needs of volunteer and career staff. Each station meets all requirements for public facility access (e.g., compliance with the Americans With Disabilities Act, dormitory, lavatory, locker and shower facilities for male and female personnel). Each station has the capacity to house at least 4 response apparatus (primary engine, one other primary fire response unit, one EMS unit, and one supervisory, special, or reserve apparatus. Other community resources (e.g., police report writing rooms, community meeting rooms) are co-located with the fire and rescue station. There are sufficient fire and rescue stations such that a flexible deployment EMS model (system status management) can be implemented which allows for most ambulance posts to be at fire and rescue stations.

3.2.6.1.1. FINANCIAL IMPLICATIONS

This level of service will require a comprehensive capital improvement plan in order to build new stations and to remodel older stations. A needs assessment will need to be conducted in order to prioritize the needs of the Department. Recommended funding is for $40,000 to $50,000 per station for a complete evaluation. Funding needs to be secured for an Apparatus Deployment software package. This package will allow staff to determine the best locations for fire and rescue stations based on historical CAD data. The cost for this package will be approximately $90,000. Upon completion of the needs assessments, the cost per new station will be from $2 million to $5 million. Upgrades of existing stations will be from $20,000 to $500,000.

3.2.6.2. AVERAGE

There are fire and rescue stations located such that that every improved parcel in the urbanized portion of the County is located 2.5 miles or less from a station. In portions of the County not slated for urban or dense suburban development, stations are located such that that every improved parcel in the rural portion of the County is located 5.0 miles or less from a station. Each station has sufficient apparatus area, living quarters, office and meeting space, physical fitness area, and other desired spaces to meet the needs of volunteer and career staff. Each station meets all requirements for public facility access (e.g., compliance with the Americans With Disabilities Act, dormitory, lavatory, locker

and shower facilities for male and female personnel). Other community resources (e.g., police report writing rooms, community meeting rooms) are co-located with the fire and rescue station. Rural fire stations have sufficient bay capacity. Each station has the capacity to house at least 6 response apparatus (primary engine, one other primary fire response unit, one EMS unit, one supervisory, special, or reserve apparatus, one water tender (tanker) and one brush unit. There are sufficient fire and rescue stations such that a flexible deployment EMS model (system status management) can be implemented which allows for most ambulance posts to be at fire and rescue stations.

3.2.6.2.1. FINANCIAL IMPLICATIONS

The initial investment for this level is similar to the high level of service. In the long term, the cost will be less due to the lower density of fire and rescue stations based on a longer distance between stations. An Apparatus Deployment software package should be used for this level at the same cost estimate as established in the high level of service.

3.2.6.3. MINIMUM

Fire and rescue stations are located based upon considerations other than response performance, such as the location of proffered properties, the location of existing volunteer company stations, etc. There is no measurable connection between predicted response patterns and the location of fire stations. Large multi-apparatus stations are utilized, rather than spreading response resources throughout the community, and multiple similar apparatus (engines and ambulances) are located in the same facility. Buildings, some of which are privately owned and some of which are public facilities, do not comply with legal requirements for public buildings. Fire and rescue stations are not shared multi-public purpose buildings.

3.2.6.3.1. FINANCIAL IMPLICATIONS

The cost for this level of service is very small. In the long term, the County may be in a position to assume responsibility for the maintenance of stations that may be cost prohibitive to operate. There is no need for deployment software under this level of service.

3.2.6.4. RECOMMENDATION FOR FIRE AND RESCUE FACILITIES

EMSSTAR recommends: "**Average**"

Rationale:

While it might be desirable to provide urban level fire and rescue coverage to all portions of the County (service level HIGH), doing so would prove to be an undue economic burden. Demands for service follow building density (for fire-related hazards) and population density (for EMS response). Therefore, it is appropriate to provide a suburban level of coverage in the more densely populated areas of the

County, which enjoy a good road network and reasonable travel speeds. An acceptable level of rural coverage can be obtained using the 5-mile standard, so long as existing apparatus resources can be better distributed throughout the western portion of the County.

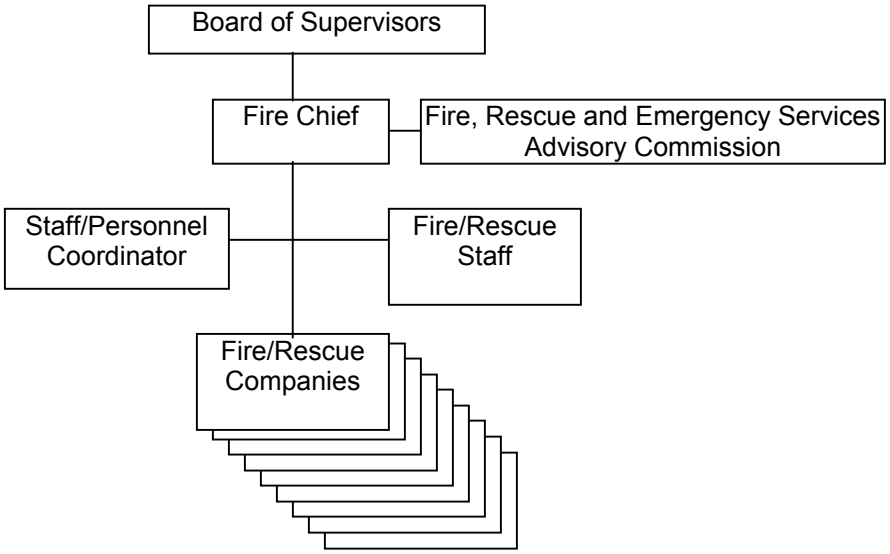
It is important to note that Loudoun County is well on its way to achieving the MEDIUM level of facility distribution. Loudoun County Fire & Rescue has been developing a well thought out facility location process, based on detailed urban planning data provided by the County. The Department has used modern, geographic information system – based planning tools and should continue to move toward its present program. It is recognized that achievement of the MEDIUM level of service will require significant capital expenditures, both to build new fire and rescue stations and to upgrade present stations to modern building standards.

3.3. HUMAN RESOURCES SERVICE LEVELS

This attribute addresses personnel matters for volunteer and career Loudoun County Fire and Rescue Department members. It deals with active line, staff, support, specialty, and ancillary fire/rescue personnel, as well as with recruitment and retention of these members. Many of the personnel attributes will be mentioned in this section but where specialized areas also address personnel matters deference, should go to the specialized area. For instance, training affects recruitment, career development, and retention and is a vital human resource area that is dealt with specifically and separately in another area of this report. This attribute centers on the Department having central authority to generally make and enforce personnel policies. Depending on the regulatory model selected, those policies may be enacted by the Chief with the advice of the Commission.

Regardless of the selected implementation level associated with this attribute, the human resources polices and practices will, of necessity, have to comply with Loudoun County, Virginia, and Federal rules regarding employment, opportunity, discrimination, equity, pay, discipline, labor practices, contractual relationships, and other rules, agreements, practices, and ordinances. Therefore each level of service presented envisions the retention of central personnel functions by the Loudoun County Human Resources Division. The model also recognizes that individual agencies may take the lead role in recruitment and retention within their traditional geographic areas of responsibility. There is a long history of unmitigated success with the community fire and rescue companies providing competent personnel to staff much of the County's fire and rescue needs. Therefore we see these as complimentary services with the County's Human Resources Division providing the framework and technical advice and assistance to local volunteer agencies while providing the full personnel services for career components of the Department.

This attribute deals with personnel matters that impact the Department while recognizing that, in fact, the controlling department for Loudoun County career personnel matters is another department outside the control of the fire/EMS agency. Volunteer personnel on the other hand are recruited by individual fire and rescue companies. Retention of volunteers is largely the expectation of the volunteer company. Career development plans for both career and volunteers are mixed and tentative at best. Training for both career and volunteer personnel is covered in the section dealing with that specific subject matter. No attempt is included to deal with a change in the structure of the Loudoun County Human Resources Division.



3.3.1. HIGH

The Department and the Volunteer Fire and Rescue Companies establish common recruitment, retention, development, benefit, and other personnel policies. This will result in uniform policies that can be consistently applied. Uniform qualifications for all personnel should result in full integration of career and volunteer officers and firefighter/medics across the Loudoun County fire and rescue operations. A full-time staff/personnel coordinator is assigned to the office of either the Loudoun County Chief (preferred) or the Loudoun County personnel department (optional). This person will be charged with recruitment and retention of volunteers and developing or integrated policies for volunteer and career personnel in conjunction with the County Chief and designated staff, the Commission and the individual fire and rescue companies. Many similar agencies utilize a volunteer coordinator but this position is seen as more than that, being responsible for all personnel matters in the agency rather than just issues regarding the volunteer members.

Within each fire and rescue company a senior volunteer fire or rescue officer is designated to liaison with the Loudoun County Fire and Rescue Staff/Personnel Coordinator. This may be a part-time paid position that represents their individual agency's needs vis-à-vis volunteer recruitment, selection, and retention.

Integration-The staff/personnel coordinator will recommend policies, as consistent as practical with mission achievement, based on input from the volunteer agency liaisons. The Chief or human resources officer, based on choices outlined above, will be responsible for adoption and implementation of policies recommended by the volunteer coordinator. Assignment of operational fire and rescue personnel will be based on specific, professional qualifications as determined by Department personnel and operations policies. Upon full implementation, all personnel will be used in a fully integrated and seamless manner utilizing County career firefighters and officers integrated fully with the volunteer officers, medics and firefighters. Career personnel will be able to transfer between divisions of the Department at the same rank without applying for the job. All personnel will be trained to ensure knowledge of, and compliance with County personnel policies and officers (operational and organizational) will be responsible for assuring compliance by all assigned and attached fire agency personnel with these policies.

Authority- Consistent with the creation, adoption, and implementation of integration of the career and personnel policies and practices and training of all Loudoun County Fire and Rescue Department personnel (career and volunteer), the County Chief and the Commission, shall review and renew or enhance their polices regarding distribution of authority to execute policy (differing significantly from creating policy) with a goal of allowing company level supervisors authority to reward and discipline assigned personnel for minor events or recommend action to the appropriate level of authority with minimum loss of time between the event and the implementation of action. The policy should provide a framework for guiding the company supervisors. This should be supplemented by evaluation and policy administration training that all company officers undergo as part of initial qualifications with regular renewal or updating. Part of supervisory evaluations then become based on effective and timely management of reward/discipline and compliance issues within their company.

Personnel Recruitment- While the County's attempts for diversity are laudable, open external competition for company level promotions are extreme disincentives for fire and rescue agency members. Focus on targeted recruiting at the entry level and where an adequate pool of candidates exists for consideration at supervisory and mid-level management, curtail external recruitment and testing. However, volunteer members should compete for promotions and career positions at all levels as internal candidates. Once the recommended career development system is implemented, a volunteer officer or firefighter would be considered a legitimate candidate for appointment to career vacancies at the next rank for which they are qualified or for a career position at their current rank. Continue external recruitment for senior management positions and specialty staff positions. Entry-level recruitment for the career force should be well advertised within the volunteer companies and individual members should be contacted via mail, Internet, or other direct contact.

3.3.1.1. FINANCIAL IMPLICATIONS:

Personnel/staff coordinator's position salary and benefits 1.0 FTE - $52,500

Office Space $3000

Administrative Support, .5 FTE training $26,250

Printing/publication $5000

Travel/transportation $5000

Volunteer Fire and Rescue Coordinators @ 20 hours/month

each totaling approximately $40,000

No additional benefits or costs anticipated for the staff.

Other implications- In addition to the dollar costs, there are likely to be organizational costs that may not be readily apparent. It seems that the appointment of the personnel/staff is likely to cause great disharmony among the volunteer agencies unless they have considerable input into the selection of that person. The appointment of liaison personnel within the volunteer agencies is likely to mitigate some of the opposition to County "control."

Use of a volunteer coordinator and agency liaisons assures all agencies have the opportunity to provide meaningful input into the development of policies.

3.3.2. AVERAGE

The Department and the Volunteer Fire and Rescue Companies establish common recruitment, retention, development, benefit, and other personnel policies. This will result in uniform policies that can be consistently applied. Uniform qualifications for all personnel should result in full integration of career and volunteer officers and firefighter/medics across the Loudoun County fire and rescue operations. The Loudoun County Fire and Rescue Chief will be charged with recruitment and retention of volunteers and developing or integrated policies for volunteer and career personnel in conjunction with the Loudoun County Personnel Department, the Commission and the individual fire and rescue companies. It is anticipated that this duty will be assigned to a senior staff officer who will regularly report progress to the County Chief.

Within each fire and rescue company a senior volunteer fire or rescue officer is designated to liaison with the Loudoun County Fire and Rescue Staff/Personnel Coordinator. This person represents their individual agency's needs vis-à-vis volunteer recruitment, selection, and retention.

3.3.2.1. FINANCIAL IMPLICATIONS

The direct financial implications are difficult to determine in that the assignment of existing personnel is not charged against a differing account. The indirect cost of supporting the liaison officers includes travel to meetings, office and administrative support, and publication of policies, estimated at >$10,000/year. In lieu of assignment of a dedicated staff member to serve as the personnel/staff coordinator, the detailing of a staff officer to that duty with the assignment of non-paid volunteer agency liaisons might be a distant alternative to the preferred (high) model.

3.3.3. MINIMUM

The Department and the Volunteer Fire and Rescue Companies establish common recruitment, retention, development, benefit, and other personnel policies. This will result in uniform policies that can be consistently applied for career and volunteer personnel as much as possible. Uniform qualifications for all personnel should result in integration of career and volunteer officers and firefighter/medics across the Loudoun County fire and rescue operations. The Chief will assist the individual volunteer companies in continuing their recruitment and retention of their volunteers. The Loudoun County Human Resources Division and the Commission will advise and assist the agencies in developing and implementing recruitment and retention programs. Recruitment and retention of career fire personnel will continue to be a function of the current County agencies responsible for their execution.

Within each fire and rescue company a senior volunteer fire or rescue officer is designated as the volunteer coordination officer who is responsible for ensuring the implementation of volunteer recruitment/retention policies and practices.

3.3.3.1. FINANCIAL IMPLICATIONS

The direct financial implications are somewhat limited in that most work is done by volunteers and members of the County Human Resources Division. The indirect cost of supporting the liaison officers includes travel to meetings, office and administrative support, and publication of policies, estimated at >$10,000/year. In lieu of assignment of a dedicated staff member to serve as the personnel/staff coordinator, an alternative of utilization of volunteers may provide sufficient staffing assistance to provide coordination of volunteer efforts.

3.3.4. RECOMMENDATION FOR HUMAN RESOURCES SERVICE LEVEL

EMSSTAR recommends: **"High"**

Rationale:

A consistent comment/input from all parties in the Loudoun County Fire and Rescue system was the lack of consistent policies and application of existing policies between career and volunteer members and equally between volunteer members at differing fire and rescue departments. Jointly developed policies and common standards and qualifications will enhance interoperability between the many volunteer fire and rescue companies as well as between those companies and the career staff. A common basis for managing and developing personnel of all categories provides a basis for appropriate and equitable management as well as providing accountability for performance for all members of Loudoun County's Fire and Rescue Services. Use of a volunteer coordinator and agency liaisons assures all agencies have the opportunity to provide meaningful input into the development of policies.

3.4. FINANCE SERVICE LEVELS

This attribute addresses the fundamental fiduciary responsibility and function of the Loudoun County Board of Supervisors in providing fiscal resources for the effective and efficient delivery of emergency services to the community. In his treatise " The Theory of Public Finance", Richard Musgrave simplifies the complex function of governmental budgeting to three distinct elements; the first element consists of an allocation decision (what services will be provided); the second, a decision that determines distribution of funds (who will get the benefits and bear the burdens); and third is the issue of stabilization and growth decision (what level of growth in income and price are acceptable). Through these various elements, the Loudoun County Board of Supervisors will apply its fiduciary and elected responsibility including establishing an appropriate mix of revenue sources to support the programs and services provided by the Loudoun County Fire and Rescue Department. Achieving an equitable balance will dictate a reliance on traditional sources and opportunities for revenue collection at the local level that primarily include the following sources of revenue: real and personal property taxes, sale-of-service fees, development charges and voluntary contribution efforts that are available to accomplish governmental and agency objectives.

3.4.1. HIGH

The Loudoun County Board of Supervisors institutes a directed real tax equitably within the County to provide baseline funding for the agency's annual operating budget. The Board establishes a fire district as authorized under 16834 Virginia Code § 27-23.1 as the mechanism to promulgate the institution of

a directed fire tax. Through this measure the board institutes a separate (distinct from the General Fund) Fire Fund as the accounting vehicle for revenues and expenditures. The Board institutes a formal development fee anchored to the agency's Capital Improvement Program and long-term planning process providing revenues to accomplish the agency's Facility Construction and Improvement Plan and the Vehicle and Apparatus Procurement and Replacement Program. The development fee is reflective of infrastructure costs associated with maintaining recommended service levels that are impacted by community growth. The Board institutes appropriate cost recovery systems for specialized programs and services amenable to fee-for-service charges. Specifically identified for these charges are services provided through the Loudoun County Fire and Rescue Department, Fire Prevention Bureau and Emergency Medical Services Programs. The Board continues to utilize the voluntary contribution program conducted by autonomous volunteer companies to augment baseline expenditures within the volunteer agency.

3.4.1.1. FINANCIAL IMPLICATIONS

If a fee-for-service approach is adopted then the County will need to either build or buy cost recovery services. In either case the process of moving to a cost recovery system generally includes the following components.

- Business Office Director 1.0 FTE $70,000. Included in this role is establishing policy for billing, collection and third party payer contracting (Medicare, Medicaid, HMO's, etc.)
- Pre-billing phase (patient and billing information is verified)
- Billing phase (bill is generated and coordination of benefits completed)
- Post billing phase (payments are posted)
- Collections (internal and external collections and legal activity)
- Reporting, monitoring and compliance
- Total FTE for the County's system approximately 12 FTE's @ $30,000 each = $360,000
- Computer and software - $10,000
- Office space, office equipment, postage, will be added cost. The actual cost of establishing this office would require a detailed evaluation and plan. Based on a private EMS organization that is a complete fee-for-service system, we plan for each bill to cost between $15-20 to produce and collect.

3.4.2. AVERAGE

The Loudoun County Board of Supervisors institutes a directed real tax equitably within the County to provide baseline funding for the agency's annual operating budget. The Board establishes a fire district as authorized under 16834 Virginia Code § 27-23.1 as the mechanism to promulgate the institution of a directed fire tax. Through this measure the board institutes a segregated Fire Fund as the

accounting vehicle for revenues and expenditures. The Board institutes a formal development fee anchored to the agency's Capital Improvement Program and long-term planning process providing revenues to accomplish the agency's Facility Construction and Improvement Plan and the Vehicle and Apparatus Procurement and Replacement Program. The Board continues to utilize the voluntary contribution program conducted by autonomous volunteer companies to augment baseline expenditures within the volunteer agency.

3.4.2.1. FINANCIAL IMPLICATIONS

This will be determined only with a full inventory of the assets and replacement schedule.

3.4.3. MINIMUM

The Loudoun County Board of Supervisors institutes a directed real tax equitably within the County to provide baseline funding for the agency's annual operating budget. The Board establishes a fire district as authorized under 16834 Virginia Code § 27-23.1 as the mechanism to promulgate the institution of a directed fire tax. Through this measure the board institutes a separate (distinct from the General Fund) Fire Fund as the accounting vehicle for revenues and expenditures. The Board continues to utilize the voluntary contribution program conducted by autonomous volunteer companies to augment baseline expenditures within the volunteer agency.

3.4.3.1. FINANCIAL IMPLICATIONS

This will have no increase in financial requirements as it will continue to use existing support provide by the County today.

3.4.4. RECOMMENDATION FOR FINANCE SERVICE LEVEL

EMMSTAR recommends: A phased approach to service level "**High**"

Rationale:

The threat to eliminate the proffer system for operational fire/rescue costs by the Virginia legislature has serious implications for the manner in which emergency services will be funded in Loudoun County. Complicating the funding issue is the degree of autonomy previously exercised by some of the independent corporate volunteer organizations in which the proffer system served to functionally support the delivery of fire and emergency medical services. As a result of the demise of the proffers for the fire/rescue operational costs and the recommended systems approach to the delivery of services, Loudoun County officials will have to rely on traditional revenue sources to meet operational and capital obligations for their emergency services program.

The utilization of a directed real tax is consistent with historical revenue generation by local government and generally reflects approximately 50% of all revenues collected. The inelastic property of this tax and its equitable application based on value makes this an appropriate vehicle for consideration. The creation of a separate and distinct fund from the County's General Fund is recommended in lieu of raising the current general tax rate. Taxpayer acceptance will generally be enhanced by identifying the rationale and need for a separate tax given the recent legislative threat.

While the County's Fire/Rescue proffer policy was intended to provide a revenue stream to support the delivery of fire and emergency services in high growth areas of the County its demise stemmed to a great extent from its unequal application to constituent groups. However, local governments have increased their dependency on proffers to provide additional revenues for costs associated with new growth. The basic premise of a proffer is that growth should bear a proportionate share of infrastructure improvements associated with providing required emergency services generated by new growth. When properly and equitably formulated, these proffers have traditionally been upheld against legal challenges.

The utilization of fee-for-service charges has gained and continues to gain popularity in local government. Recognizing that users of a particular service that are amenable to charges should help to fund the delivery of the program and service has historically been recognized in areas such as parks and recreation (golf courses) and sewer, utility and water system through enterprise funds. Component elements of the fire emergency services delivery system are appropriate for considering the institution of user fees. Specifically, services provided through the agency's fire prevention bureau such as plan reviews, occupancy inspection and permit issuance are appropriate for cost recovery through this mechanism. These are services that are not required by the general population, are limited to a specific occasion and can be implemented with relative ease. Emergency Medical Service transports should also be considered as a potential area in which costs can be recovered. Inclusive is the recognition that constituents through their Federal tax dollars support the Medicare and Medicaid programs which will reimburse providers of patient transport services thereby providing additional revenue to local government. This influx of additional revenue reduces the fiscal impact of providing the service and correspondingly reduces reliance on local taxes generated from property owners.

The current composition of the emergency services delivery system has been highly dependent on voluntary contributions to support service delivery. This process is highly identified with volunteer services and should be continued to assist the volunteer agencies in enhancing service delivery within their sphere of responsibility. This funding mechanism will assist in lower operational costs supported by tax revenues and will serve to strengthen the transition from independent autonomous operations to a unified countywide structure.

3.5. MEDICAL DIRECTION SERVICE LEVELS

This attribute addresses Medical direction, which involves granting authority and accepting responsibility for the care provided by the EMS system and its personnel. It includes participation in all aspects of the EMS system to ensure maintenance of accepted standards of medical practice. To be successful at achieving quality for any system, in terms of its clinical success at effecting meaningful

outcomes and proficiently providing appropriate levels of service, medical direction and administrative management components of the system must be working in concert.

In the Commonwealth of Virginia a medical director must be designated for each EMS agency. Certain routine tasks are incumbent upon the medical director. In the broadest terms, however, the medical director's role is to provide medical leadership for the system. He or she is the principal authority for granting clinical privileges, or providing local credentials for EMS personnel. The Medical Director maintains the ultimate responsibility for providing clinical direction to the system's personnel through protocols, standing orders, or "on-line" communication, affecting each and every EMS patient's care. It is he or she, working with the other leaders of the system, who is charged with ensuring the clinical quality of service. As the presence, or absence, of quality may be indicated by many measures, part of the medical director's responsibility entails assessing potential indicators of quality and implementing processes to achieve it. Thus, he or she is responsible for developing, maintaining, and improving perpetual efforts to evaluate the effectiveness and efficiency of the EMS system. The results of such evaluation guide further evolution of the system, so that it might best provide the desired level of service for the community it serves.

In addition to the EMS medical director, other personnel often serve vital roles to ensure the adequate provision of medical direction. These include individuals in administrative, support, and advisory capacities.

3.5.1. HIGH

Loudoun County appoints a full-time Medical Director for its fire/EMS and emergency management system. The medical director is a qualified EMS physician by virtue of education, training, and/or experience. He or she reports to the Chief, and works with the Chief to ensure the quality of service provided to the community.

The Medical Director has the authority to grant or deny clinical privileges to personnel within the EMS system, which includes all career and volunteer providers within Loudoun County. Working with a medical advisory group, that includes representation from the Fire, Rescue and Emergency Advisory Commission, he or she develops and maintains a system of clinical protocols and/or standing orders to facilitate the appropriate state-of-the-art care for all EMS patients. Additionally, the Medical Director maintains an accountability system to provide "on-line" medical direction via radio and/or other means of communication between EMS personnel and him/herself or designee(s). There is a staff paramedic that provides in-field staff support; manages data and information related to medical quality improvement; and assists the medical director in overseeing implementation of medical quality improvement plans.

The Medical Director, working with the Chief and other administrative leaders and advisory groups, develops processes for EMS system evaluations of system structures, processes, and outcomes. The results of such evaluations are routinely and periodically shared with County leadership. The Medical Director routinely participates in the planning and provision of initial and continuing education of the County's EMS personnel.

By virtue of a County-issued response vehicle, the Medical Director is expected to provide occasional contemporaneous oversight of the EMS system and its personnel by responding directly to emergency scenes. Response to certain types of critical incidents is routinely expected.

He or she is the principal liaison for the County fire/EMS and emergency management to other health care providers. Additionally, the Medical Director serves as a liaison to other County agencies requiring medical advice or assistance (e.g., medical support of Sheriff's operations. The Medical Director is supported by an ancillary staff member and shared clerical assistance.

3.5.1.1. FINANCIAL IMPLICATIONS

Medical Director (1 FTE) $180,000

Staff Paramedic (1 FTE)..... $54,800

Administrative assistant (0.5 FTE)..... $19,000

Response vehicle and equipment $35,000

Indirect support office space and furnishings, computer,

communications equipment..... $75,000

3.5.2. AVERAGE

Loudoun County appoints a half-time Medical Director for its fire/EMS and emergency management system. The Medical Director is a qualified EMS physician by virtue of education, training, and/or experience. He or she is contracted for the service and reports to the Chief. The Medical Director works with the Chief to ensure the quality of service provided to the community.

The Medical Director has the authority to grant or deny clinical privileges to personnel within the EMS system, which includes all career and volunteer providers within Loudoun County. Working with a medical advisory group, he or she develops and maintains a system of clinical protocols and/or standing orders to facilitate the appropriate state-of-the-art care for all EMS patients. Additionally, the Medical Director maintains an accountable system to provide "on-line" medical direction via radio and/or other means of communication between EMS personnel and him/herself or designee(s). There is a staff paramedic that provides in-field staff support; manages data and information related to medical quality improvement; assists the part time medical director in overseeing implementation of medical quality improvement plans.

The Medical Director, working with the Chief and other administrative leaders and advisory groups, develops processes for EMS system evaluations of system structures, processes, and outcomes. The results of such evaluations are routinely and periodically shared with County leadership. The Medical Director routinely participates in the planning and provision of initial and continuing education of the County's EMS personnel.

By virtue of a County-issued response vehicle, the Medical Director is expected to provide occasional contemporaneous oversight of the EMS system and its personnel by responding directly to emergency scenes. Response to certain types of critical incidents is routinely expected.

He or she is the principal liaison for the County fire/EMS and emergency management to other health care providers. The Medical Director is supported by an ancillary staff member and shared clerical assistance.

The principal differences between high and medium service levels relate to the relationship between the County and the Medical Director (full-time employee v. contracted service provider). Although many activities at both levels would be similar, the degree of commitment to the program and day-to-day involvement of the Medical Director at the higher service level would be expected to be greater.

3.5.2.1. FINANCIAL IMPLICATIONS

Medical Director (0.5 FTE) ..... $75,000 (stipend)

Staff Paramedic (1 FTE)..... $54,800

Administrative assistant (0.5 FTE)..... $19,000

Response vehicle and equipment $35000

Indirect support office space and furnishings, computer

communications equipment..... $75,000

3.5.3. MINIMUM

Loudoun County appoints a part-time Medical Director for its fire/EMS and emergency management system. The medical director is a qualified EMS physician by virtue of education, training, and/or experience. He or she is contracted for the service and reports to the Chief. The Medical Director fulfills the duties required by the Commonwealth of Virginia and provides advice to the Chief to help ensure the quality of service provided to the community.

The Medical Director has the authority to grant or deny clinical privileges to personnel within the EMS system, which includes all career and volunteer providers within Loudoun County. He or she approves clinical protocols and/or standing orders to facilitate the appropriate state-of-the-art care for all EMS patients. Additionally, the Medical Director participates in a system to provide “on-line” medical direction via radio and/or other means of communication between EMS personnel and him/herself or designee(s). There is a staff paramedic that provides in-field staff support; manages data and information related to medical quality improvement; assists the part time medical director in overseeing implementation of medical quality improvement plans.

The Medical Director participates in efforts to evaluate the EMS system. He or she participates in planning and providing the initial and continuing education of the County's EMS personnel. The Medical Director is supported by an ancillary staff member and shared clerical assistance.

The principal difference between the average and minimum levels involves the level of service being provided by the Medical Director. At the minimum level, perfunctory duties are fulfilled, but other appropriate areas of Medical Director involvement for ensuring the quality of the system are left void.

The Minimum Level of Service is not progressive, and does not reflect the future of EMS in Loudoun County, or in similarly positioned counties in the United States. Such a commitment may be commensurate with many communities across the country. However, the associated EMS systems would not be among those widely regarded as particularly effective. Over the next several years, the needs of Loudoun County will grow. The Minimum Level of medical direction, while meeting Commonwealth minimum requirements for medical direction, would not facilitate growth of the EMS system or enhancement of its quality.

3.5.3.1. FINANCIAL IMPLICATIONS

Medical Director (0.5 FTE) ..... $18,000 (stipend)

Staff Paramedic (1 FTE)..... $54,800

Administrative assistant (0.5 FTE)..... $19,000

Indirect support office space and furnishings, computer $10,000

3.5.4. RECOMMENDATION FOR MEDICAL DIRECTION SERVICE LEVEL

EMSSTAR recommends: "**Average**"

Rationale:

The importance of the role of medical direction in an evolving EMS system cannot be overestimated. As various elements of the fire/EMS and emergency management system necessarily garner the attention of the leadership from time to time, there must always be an eye on the people of the community and the patients the EMS system serves. The best avenue to guaranteeing that watch is by securing an adequate level of medical direction.

The High Level of Service is ideal, especially from a medical director's perspective. Clearly, it provides the greatest probability of attention to medical details. This level of commitment, both philosophically and monetarily, is found among larger cities and urbanized populated counties. While such an investment by Loudoun County would be laudable, the EMS system could likely reach its potential without incurring such an associated cost.

The Average Level described above involves a considerable commitment on the part of the County, one that it hasn't had to realize until now. However, it ensures that there is adequate clinical oversight of the system that is designed to provide clinical care. It helps to ensure that there is a measurable level of qualified physician input to a system conceived as an extension of physician care to the field. The County has recognized that it is or will be facing challenges with regard to its EMS system. Among these are the maintenance of quality in a growing system, the development and maintenance of a qualified staff, the provision of state-of-the-art clinical care appropriate to the environment, and trying interfaces with other local health care providers. Addressing these issues, among the many others, while advancing the system requires a degree of commitment and dedication from a medical director and staff. The Average Level of medical direction provides for a predictable presence and involvement of the Medical Director at all facets of EMS system planning, implementation, and evaluation. This participation in a system such as that in Loudoun County, administrative and medical direction management components working together, is paramount to the system's success in providing appropriate service to the community and in achieving meaningful outcomes for patients.

3.6. MEDICAL FACILITIES SERVICE LEVELS

Hospital emergency departments or freestanding emergency facilities (e.g., ACCESS) are the receiving stations for emergency medical services patients, and are integral to the system. For the EMS system to be both effective at contributing to improved patient outcomes and efficient at delivering service, appropriate medical facilities must exist and be available to accept EMS patients.

The availability of emergency facilities should enable the EMS system to deliver the spectrum of its patients to appropriate sites for care in a timely manner. The meaning of "timely" is ultimately at the discretion of the EMS system and the community it serves. For example, in an urban setting one might expect that a seriously injured person arrive at a tertiary care trauma center within 20 minutes of the injury. There may be more than one trauma center available to help meet that goal. In a more suburban or rural area the expectation for patient arrival at a trauma center may not be for 60 minutes or more, and many such patients may be preliminarily transported to a community hospital for initial stabilization. Similar sorts of variation in expectations may be applied to patients suffering from acute stroke, heart attack, and other conditions.

As treatments for certain maladies advance, such as primary angioplasty for acute myocardial infarction and thrombolytic therapy for acute stroke, it is incumbent upon EMS system leaders to make responsible decisions for their communities regarding acceptable receiving facilities and tolerance for transport times to reach definitive care. While there are guidelines that establish the windows of opportunity to provide certain care, and triage guidelines help to determine the appropriateness of air medical transport, there are no standards that provide direct guidance to community leaders facing issues related exclusively to transport times.

All emergency medical facilities designated to receive EMS patients incur responsibilities to the system. Among these is responsibility to be a partner with the EMS system in the delivery of emergency care to the community. Partnership entails working with EMS system leaders to establish appropriate patient destination guidelines, participating in evaluation and quality improvement efforts by providing needed data and information, and committing address issues relating to diversion or by-pass practices. Collaboration among EMS systems and emergency medical facilities can also lead to development of resources for education, evaluation, medical direction, and logistical support. Synergistic efforts to improve community health through education and prevention initiatives can also be pursued.

3.6.1. HIGH

EMS protocols provide guidance related to patient transport. These include delineation of specific centers as they relate to certain patient groups (e.g., pediatric trauma, acute stroke, and others). The EMS system maintains formal relationships with all routine receiving facilities. These relationships foster collaborative efforts to resolve EMS system issues, achieve the greatest likelihood of optimal patient outcomes, and improve the overall system. Furthermore, emergency facilities that routinely receive EMS patients readily participate in system evaluation and quality improvement efforts, in part by providing needed data and information.

Benchmarks are established and continually evaluated regarding transport time intervals for various groups of patients. The availability of emergency facility resources enables at least 95% of EMS patients to be transported to their receiving facility within 30 minutes. Plans are developed and eventually implemented to maintain a second emergency medical facility within Loudoun County. Loudoun Hospital Center and the second facility serve as the foci for EMS system – medical facility relationships. Also refer to Trauma Systems Service Levels (3.7.1).

3.6.1.1. FINANCIAL IMPLICATIONS

Receiving Emergency Medical Facility Advisory Group $1,000
Development costs related to establishing new emergency

Medical receiving facility ..... No cost to Department
No other direct costs for the County

3.6.2. AVERAGE

EMS protocols provide guidance related to patient transport. These include delineation of specific centers as they relate to certain patient groups (e.g., pediatric trauma, acute stroke, and others). The EMS system maintains relationships with all routine receiving facilities. Emergency medical facilities that routinely receive EMS patients readily participate in system evaluation and quality improvement efforts, in part by providing needed data and information.

Benchmarks are established and continually evaluated regarding transport time intervals for various groups of patients. Also refer to Trauma System Service Levels (3.7.2).

3.6.2.1. FINANCIAL IMPLICATIONS

No direct financial implications to the County. Indirect costs may eventually be realized from longer transport time intervals and the resulting need to provide additional resources to maintain proscribed service levels.

3.6.3. MINIMUM

With the exception of trauma patients, EMS patients are transported to the closest available hospital, as diversion requests by hospitals are honored. Transport time intervals are monitored in efforts to determine needed resource augmentation to provide proscribed levels of service. Relationships with EMS receiving medical facilities are casual. Medical facilities only participate in quality improvement activities when there is a specific issue to be investigated or resolved. Also refer to Trauma System Service Levels (3.7.3).

3.6.3.1. FINANCIAL IMPLICATIONS

No direct financial implications to the County. Indirect costs may eventually be realized from longer transport time intervals and the resulting need to provide additional resources to maintain proscribed service levels. Additional costs will be incurred in terms of system quality degradation without medical facility participation in evaluation and quality improvement efforts.

3.6.4. RECOMMENDATION FOR MEDICAL FACILITIES SERVICE LEVEL

EMSSTAR recommends: "**High**"

Rationale:

Enhancing the quality of emergency medical care in the community, and striving to improve community health requires a collaborative effort. Essentially, the Loudoun County EMS system provides a great service, not only to its community constituents, but also to the medical facilities to which it transports its patients. As part of their declared commitment to the community, these facilities are obliged to participate, with the EMS system, in efforts to improve care and the manner in which it is delivered.

As the sophistication of definitive care for serious and often debilitating illnesses and injuries has evolved tremendously over the past several years, disparity has often developed among hospitals' abilities to deliver optimal care. The EMS system has a duty to be cognizant of these disparities, when they exist. Stated another way, the EMS system of a technologically advanced and sophisticated

community should be aware of where the best care can be delivered to its community members, and seek that care for them when it is appropriate and feasible.

It is imperative that there be some basis for determining the appropriateness of transport time intervals. Establishing benchmarks for certain types of conditions, and for the EMS system as a whole, will help.

The EMS system needs a "medical home." As Loudoun Hospital Center is currently the only facility in the County, it should serve that role and be the model for relationships between the EMS system and other EMS receiving medical facilities.

The high service level indicates the need for an additional EMS receiving station within Loudoun County. It is important to realize that this recommendation is made on the basis of the understanding of the current demography of the County and its anticipated expansion, and an understanding of the current stresses of the EMS system related to receiving medical facilities. A second facility is suggested as a solution to the occasionally saturated current facility, and could furthermore be positioned to provide improved access to some of the County's EMS providers. This report, however, cannot include recommendations regarding the exact nature of a second receiving facility, as the analysis required for such decisions is not within the scope of the current work plan.

The average level of service described above is only minimally progressive. It fails to embody the synergy that can be achieved through collaboration of the host of receiving medical facilities with the EMS system to improve emergency care to the community. It describes only modest efforts by the EMS system to be proactive in delivering its patients to optimal care in a timely manner.

The minimum service level described is not at all progressive. It is not commensurate with the future of Loudoun County or its EMS system, as EMSSTAR has come to understand them.

As Loudoun County continues to evolve, its fire/EMS and the Department will necessarily evolve as well. Part of that evolution should be in terms of the relationships between the EMS system and the medical facilities to which and for which it provides service.

3.7. TRAUMA SYSTEMS SERVICE LEVELS

This attribute addresses the trauma care components, which must be in place and integrated with the overall EMS system. All personnel functioning within the EMS system – both pre-hospital and in-hospital – should have knowledge of the capabilities of each of the institutions that are available for the destination of the severely injured within Loudoun County. This should include the availability of burn centers, spinal cord centers and trauma centers. For this to function smoothly, criteria for triage and transfers should be developed, as well as data collection from both pre-hospital and hospital data. It is essential that that feedback (both positive and negative) be given to the providers of care; and that when necessary, educational programs should be instituted to meet needs. Trauma centers should be linked to acute rehabilitation where patient need mandates such referral patterns. Information and

trends from the data collected on trauma patients should be reflected in local injury prevention programs and public educational materials.

3.7.1. HIGH

The existing hospital resources within the County are upgraded to meet criteria of a Level II Trauma Center. Under this model, the hospital and the medical staff would incur considerable costs; but there would be relatively few costs to the County. Virtually all trauma patients within the County would be hospitalized at this facility; it will be anticipated that the destinations of such specialized injuries as pediatric trauma, spinal cord injury and major burns would be other facilities in the metro Washington, DC area. The capabilities of a Level II Trauma Center would attract trauma patients from outside the County, which might be required to sustain this as a viable model and appropriate utilization of expensive infrastructure. As a Level II Trauma Center, the local facility will establish a Trauma Nurse Coordinator position, which would assist the County in data collection and the development of appropriate community outreach programs. The County would establish its own position of Trauma System Coordinator. This individual would work with the hospital Trauma Nurse Coordinator to ensure appropriate feedback to responding units, target educational programs and map areas of the areas of the County with a higher than expected trauma incidence. It would then trigger appropriate prevention programs.

3.7.1.1. FINANCIAL IMPLICATIONS

Hospital Costs: There will be considerable hospital costs involved in developing the hospital resources and medical staff in order to become a Level II Trauma Center. There would also be political implications as this is fairly close to the Fairfax Hospital, Level I Trauma Center.

County Costs: Under this model, there would be one FTE at approximately $70,000 to function as a County Trauma System Coordinator. This individual would be responsible for ensuring clinical feedback to EMS providers and also for the monitoring and implementation of trauma prevention and public information programs.

3.7.2. AVERAGE

The existing hospital resources are upgraded to meet Level III Trauma Center standards. Under this level of service, most of the trauma of the County would continue to come to the local facility. After evaluation, those patients who would require complex intervention, such as those patients with a ruptured aorta, would be transferred to Level I or a Level II in the metro Washington, DC area. The majority of trauma patients would be treated at the local level. Severe pediatric trauma or spinal cord injuries could either be stabilized at the local facility and transferred or directly evacuated from the scene, either by ambulance or helicopter, to designated facilities outside the County. System trauma triage criteria will be developed for all County EMS personnel and compliance with these would be monitored by the County Trauma System Coordinator. This individual would review EMS data and hospital discharge data to determine areas of the County with a high prevalence of acute injury. Within the County programs would be developed that would address these identified areas by

appropriate public information and injury prevention programs. It is anticipated that implementation of a Level III Trauma facility would not raise as many political obstacles that would be expected by neighboring Level I Trauma Centers.

3.7.2.1. FINANCIAL IMPLICATIONS

Hospital Costs: A detailed analysis would need to be performed of the capabilities of the local institution and the necessary requirements to proceed to Level III verification by the Commonwealth of Virginia. All of these costs would be assumed by the hospital.

County Costs: At the County level, it is anticipated that a 50% FTE, $35,000 as a Trauma System Coordinator could achieve the functions of necessary feedback to local rescue squads and EMS personnel and analyze and implement appropriate prevention and public education strategies.

3.7.3. MINIMUM

The minimum level service appropriate trauma/triage policies are developed and implemented Countywide. The local hospital facility does not maintain a Level III or Level II Trauma Center capability; but rather maintains it as a basic Emergency Department or as a Level IV Trauma facility. Under this scenario, single system injury can be managed at the local level; but all more complex multi-trauma are transferred to other Level I, II or III facilities in the environs of the County. The trauma triage criteria are developed and implemented as such. Note that in this scenario the ambulance personnel may have to travel out of County to other trauma facilities in order to allow citizens to obtain the appropriate level of care. As with all of the other scenarios, the more complex injuries such as burns, spinal cords and major pediatric trauma are evacuated to appropriate designation facilities.

3.7.3.1. FINANCIAL IMPLICATIONS

Hospital Costs: Zero.

County Costs: At the County level under this low level of service, there would be no County Trauma System Coordinator. Analysis and feedback in the development of appropriate prevention programs would be dependent upon support at the Commonwealth level or those coming out of existing Level I and II Trauma Centers. There may be increased cost for the EMS service as more ambulances will be out of service while transporting an increasing number of patients out of the County for appropriate medical intervention.

3.7.4. RECOMMENDATIONS FOR TRAUMA SYSTEM SERVICE LEVEL

EMSSTAR recommends: **"Average"**

Rationale:

The existing prevalence of major trauma is approximately one major trauma patient per 1,000-1,250 population per year (American College of Surgeons-Committee on Trauma.) Under this scenario, the projected County population of 400,000 would generate approximately 400 major trauma patients per year. While approximately 15% of these would be severely injured pediatrics, major burns and spinal cord injuries, the estimated 340 patients would be hospitalized at the local level. It would be anticipated that as the County re-evaluates and builds hospital facilities to manage the increasing population, the capabilities required to meet population needs would be easily modified to meet Level III Trauma Center criteria. While this may not be possible in the short-term (1-2 years), this should be envisioned as a more long-term project. In conjunction with the hospital, the County should fund the 50% FTE and provide appropriate feedback to EMS providers. In addition, the public information and prevention activities should be controlled at the local County level, rather than be dependent upon outside sources.

3.8. COMMUNICATIONS SERVICE LEVELS

This attribute addresses public access to the system and the ability of all system elements to effectively and efficiently communicate amongst themselves. It includes telephone access (hard-wire and wireless), central alarm station monitoring, radio dispatch and paging, and radio communication between dispatch centers, mobile units, and portable units. At the higher levels, it also includes digital data communication between dispatch centers, mobile, and portable units.

3.8.1. HIGH

State-of-the-art telephone equipment, compliant with the FCC Phase II wireless initiative, is utilized by centralized call-takers to receive all emergency and non-emergency requests for service from the public. Accurate geographic databases allow for automatic location of 99.5% of all telephone calls. Requests for service are quickly routed to appropriate dispatch personnel, who are able to simultaneously dispatch appropriate units and provide pre-arrival instructions to callers. Initial responding units are alerted within 30 seconds within initial call classification, and additional resources are dispatched as further information becomes available. All public safety response personnel in Loudoun County (law enforcement, fire, rescue, EMS, emergency management, public works, and transportation) utilize a common, state-of-the-art voice and data communications system (at this time, probably trunked 800 mHz), allowing segregated communication for day-to-day events while allowing easy inter-operability with other County departments. The system is fully inter-operable with all surrounding and concurrent jurisdictions (Commonwealth and federal).

3.8.1.1. FINANCIAL IMPLICATIONS

Cost: Estimate: $40-50 million for an all-new system.

CAD system (replace current CADs): $2,000,000

800 mHz radio control system (Motorola Smart Zone® or equiv.)..... $2,000,000

Trunked radio sites with hardware and connections $14,000,000

(14 @ $1 million ea.)

Computerized telephone system with ANI, ALI, phase 2 ..... $1,000,000

(Plant Vesta® system or equivalent)

Mobile and portable radios 2500 @ $2,500 each..... $5,000,000

Engineering, communications center configuration, etc..... $2,000,000

Precisely fixing a cost for a complete public safety communications system is well beyond the scope of this report, and requires the expertise of a sophisticated engineering firm specializing in public safety communications. Moreover, this system element needs to be considered independently from system structure decisions, because communications systems are necessary regardless of the organizational structure and characteristics of delivery personnel (volunteer, career, or both.)

3.8.2. AVERAGE

Computerized telephone equipment, compliant with the FCC Phase II wireless initiative, is utilized by centralized call-takers to receive all emergency and non-emergency requests for service from the public. Accurate geographic databases allow for automatic location of 99.5% of all telephone calls. Requests for service are quickly routed to appropriate dispatch personnel, who are able to simultaneously dispatch appropriate units and provide pre-arrival instructions to callers. All fire and EMS personnel in Loudoun County utilize a common voice communications system (at this time, probably trunked 800 mHz). Operations with other County departments and other jurisdictions require telephone or radio relay by dispatch personnel.

3.8.2.1. FINANCIAL IMPLICATIONS

Cost: similar to “high” option.

3.8.3. MINIMUM

Computerized telephone is utilized by centralized call-takers to receive all emergency and non-emergency requests for service from the public. Geo-bases allow for the automatic location of the majority of calls, but assignments must often be based on geographic knowledge of dispatch personnel. Requests for service are quickly routed to appropriate dispatch personnel, who are able to simultaneously dispatch appropriate units and provide pre-arrival instructions to callers. All fire and EMS personnel in Loudoun County utilize a common voice communications system. Operations with other County departments and other jurisdictions require telephone or radio relay by dispatch personnel.

3.8.3.1. FINANCIAL IMPLICATIONS

Costs: The cost to implement this level of service is minimal. The use of current radio systems will eliminate capital cost. The only cost will be the continuous maintenance of the current system.

3.8.4. RECOMMENDATION FOR COMMUNICATIONS SERVICE LEVEL:

EMSSTAR recommends: Phased approach to service level ***"High."***

Rationale:

Loudoun County exists in a complex communications environment. Although much of the County thinks of itself as rural community, it lies in an area that presents the most substantial communications challenges available. The multi-jurisdictional nature of the metropolitan Washington DC area, and the co-location of Washington-Dulles International Airport, along with the proximity of the Maryland border and a significant federal presence pose great challenges to Loudoun County's communications system. Moreover, the area faces a higher likelihood of disasters (aircraft and transportation accidents, weapons of mass destruction) due to the proximity of the federal enclave, the presence of major information infrastructure providers, and the extensive transportation network. Accordingly, anything less than full functionality and absolute reliability will not serve the County well moving into the future.

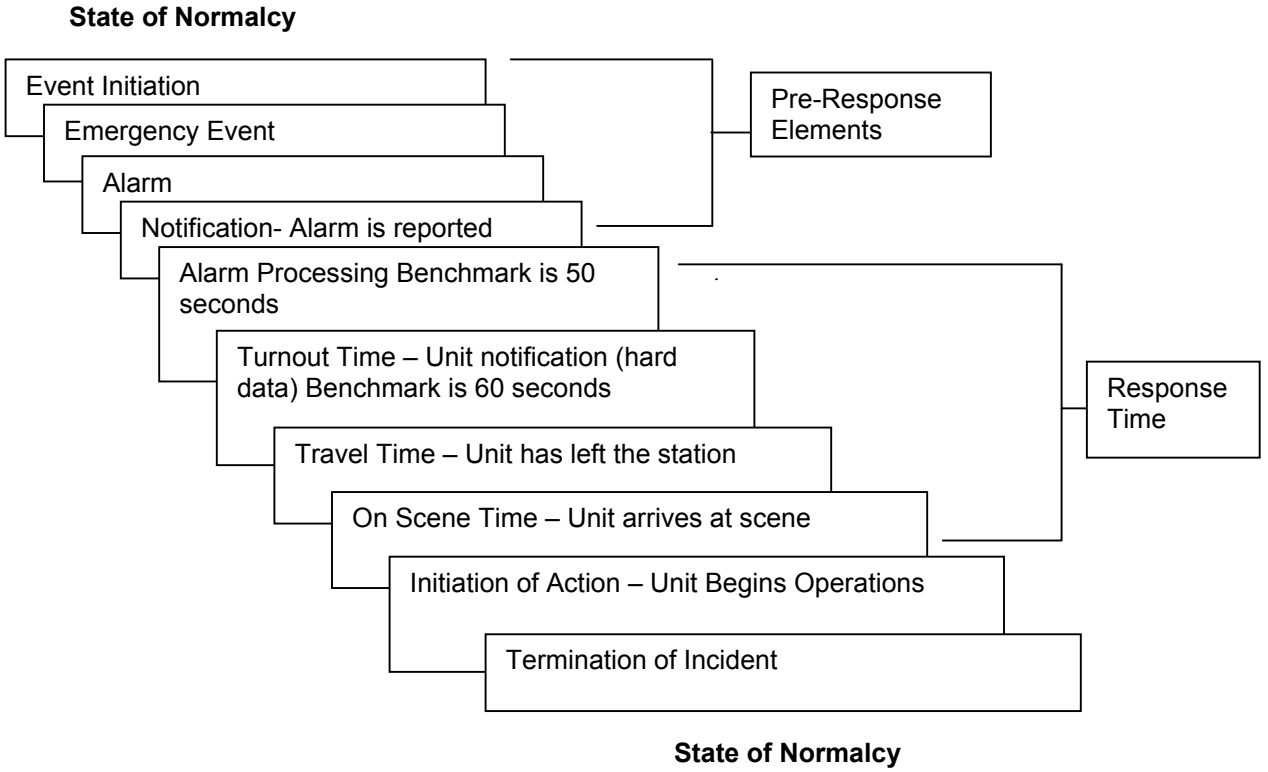
3.9. RESPONSE PERFORMANCE SERVICE LEVELS

This attribute addresses performance standards for emergency response Countywide. Rapid response is critical in sustaining a good outcome on fire and EMS emergencies. During medical emergencies, the outcome for the patient is often directly tied to the entry into the EMS system, speed of the delivery of basic life support with early defibrillation, followed by advanced life support with transport to an appropriate medical facility. In fire responses, the goal is to establish an effective fire attack prior to the point of flashover. Flashover is the point when everything in a room is heated to its ignition temperature, at which time the room is fully consumed in flames. When flashover occurs, the contents of the room or building are destroyed, and the danger to firefighters and fire victims is at an

unacceptable level. In most cases, people that are caught in a flashover are unable to live through the fire. The point that a flashover occurs is dependent on contact time and heat potential of materials in the room.

In fire and emergency medical emergencies, events occur on a continuum. The Commission on Fire Accreditation International uses a diagram that makes it easy to track response elements. The following diagram depicts this sequence.

Emergency Operations Cascade of Response Elements



This attribute addresses this entire continuum, as a comprehensive system is one that minimizes the amount of time required for each element. However, the major thrust of this attribute is to reduce the elements that are defined as response times.

The following levels of service indicate different levels of response performance that are available to Loudoun County.

3.9.1. HIGH

A high level of response performance will result in a short response time for all fire and EMS responses. A complete risk assessment for the County will be completed and maintained. The Department will have a Standard of Coverage document that is based on the risk assessment. All measurements of response time will be fractile response times that exceed national standards for response times. The use of average response times will be used for information purposes only and will not be used to measure performance. The standard of cover will differentiate different levels of risk and correlate response times according to risk. Response time goals will be less than the accepted standard of providing basic life support and advanced life support for all life threatening calls 90% of the time. Alarm processing and turnout times are less than set benchmarks (National Fire Protection Association (NFPA), Commission on Fire Accreditation International (CFAI), Commission on Accreditation of Ambulance Services (CAAS)).

Response times for fire responses will allow for response and set-up for fire attack and be less than the time for flashover to typically occur in the type of occupancy that the response is being made for.

The Department will have a standard deployment plan that outlines the number of personnel needed to perform tasks that are required for various emergencies scenarios. Dispatch assignments will be made based on the number of personnel needed to safely perform identified tasks.

All personnel that respond to incidents will be properly trained to the national or Commonwealth standard for the respective response.

3.9.1.1. FINANCIAL IMPLICATIONS

Financial implications for this attribute are difficult to determine. If response goals can be met with volunteers, then the amount of funding needed will be minimal. However, if volunteers do not meet response time goals, then additional career staff must be added to reduce response times.

Funding will be required to conduct a risk assessment. It is estimated that one full time position will be required to manage a risk assessment and standard of cover program. In addition, software will be required to adequately track this information. Estimated cost for this level of service is $125,000

3.9.2. AVERAGE

An average level of response performance will result in response times for all fire and EMS responses that meet the community's expectations for rapid response. A complete risk assessment for the County will be completed and maintained. The Department will have a Standard of Coverage document that is based on the risk assessment and on an urban/rural designation. Response time goals to rural areas of the County will be longer than urban areas, based on travel distance that is required in rural areas.

All measurements of response time will be fractile response times that exceed national guidelines for response times (NFPA, CAAS, CAFI). The use of average response times will be used for information purposes only and will not be used to measure performance. The standard of cover will differentiate different levels of risk and geographical location, and correlate response times according to risk and location. Response time goals for urban and rural areas will meet the accepted standard of providing basic life support and advanced life support for all life threatening calls 85% of the time, in accordance with the standard of cover. Alarm processing and turnout times meet set benchmarks.

Response times for fire responses will allow time for response to the emergency and set up for fire attack prior to flashover to typically occur in the type of occupancy that the response is being made for.

The Department will have a standard deployment plan that outlines the number of personnel needed to perform tasks that are required for various emergencies scenarios. Dispatch assignments will be made based on the number of personnel needed to safely perform identified tasks.

All personnel that respond to incidents will be properly trained to the national or Commonwealth standard for the respective response.

3.9.2.1. FINANCIAL IMPLICATIONS

Financial implications will be the same as the high level of service in the short term. In the long term, the cost for this level of service will be lower due to the longer response time goals and for the 85% compliance rate in comparison to the 90% compliance rate for the high level of service.

3.9.3. MINIMUM

A low level of service is one that has accepted response standards that are not based on objective data or national standards. Response standards are based on the ability to meet the standard, rather than on the provision of service within accepted time frames. Risk assessment is made on subjective determinations of company level personnel and are not formally reviewed or documented. The standard of cover document is used as a guide for dispatch protocols, but is not used in a real time fashion to assure that adequate personnel are dispatched to emergency incidents.

Response times are measured and reported as average response times. Each company has different standards as to acceptable response times. Call processing and turnout times are used as guidelines and are not measured.

Response time for medical emergencies exceed accepted standards. Fire response standards do not take flashover into consideration and exceed the amount of time it takes to travel to an emergency and prepare for fire attack before flashover occurs.

Personnel are trained to the minimum level to perform on the emergency scene.

3.9.3.1. FINANCIAL IMPLICATIONS

This level of service requires minimal funding. This level of service would not mandate any standard response time and therefore, the ability to meet this standard should be very easy and have minimal impact on the budget.

3.9.4. RECOMMENDATION FOR RESPONSE PERFORMANCE SERVICE LEVEL

EMSSTAR recommends: "**Average**"

Rationale:

The average level of service sets the Department up to meet national standards and recognized guidelines for fire and EMS responses (NFPA, CAAS, CFAI). A risk assessment has been completed that will give the Department information about the risk throughout the County. It then further divides the County into urban and rural areas. Given the diverse areas of the County, it is not realistic to believe that response times will be as fast in rural areas as they are in the urban areas. This level of service realizes that reality and gives the Department and the County the ability to set different standards based on a good risk assessment.

A unified standard of cover sets the minimum amount of equipment and personnel that are necessary to successfully mitigate emergency situations. This assures that all tasks can be completed in a timely fashion and thus will result in a faster resolution to the emergency. The standard of cover also ties directly into the risk assessment to assure that high risk properties get the necessary response force, while lessening the response force to low risk emergencies such as rubbish fires or dumpster fires.

The measurement of response times under this level serves a two-fold purpose. First, it measures them in fractile times rather than average times. Average response times means that 50% of the time a response time is better, and 50% of the time, a response time is worse. Fractile response times measure how often the Department is meeting the stated goals. Secondly, an 85% compliance rate as outlined in this level is very realistic and can be accomplished with good planning.

Lastly, once personnel are on the scene, it is critical that they be properly trained to perform emergency tasks. This level will assure that they meet national and Commonwealth standards in order to effectively take the appropriate action based on the emergency at hand.

3.10. DATA AND EVALUATION SERVICE LEVELS

This attribute speaks to the ability of the system to account for its performance to the authority having jurisdiction, to the citizens of the jurisdiction, and to the internal structure of the Department. It addresses the reporting of data concerning the efficiency, effectiveness, and quality of service delivery by those delivering the service, as well as the analysis and reporting of that data to those responsible for policy-making, administration, and management of the system.

3.10.1. HIGH

There is a comprehensive and sophisticated records management and reporting system that is fully integrated with Loudoun County's computer-aided dispatch system. This system allows for real-time or near real-time reporting of service delivery data, including:

- Fire response and suppression;
- EMS response and patient care delivery;
- Fire inspections and investigations;
- Fire, EMS, and administrative training activities;
- Resource tracking (fire hose, medical equipment, etc.);
- On-duty and volunteer personnel activities (scheduling and on-duty time, volunteer responses and point accumulation); and all other Department activities.

There is sufficient staff qualified for and dedicated to the information gathering and analysis function, with appropriate analytical tools to manage the system and to produce useful, high-quality output for all consumers of fire and rescue data. Field personnel (firefighters, EMTs and paramedics, inspectors and investigators) are connected to the records management and reporting system by wireless networking or other appropriate technology.

3.10.1.1. FINANCIAL IMPLICATIONS

Records Management System	$500,000
(central hardware and application software)	
Annual licenses and maintenance	$75,000
Wide area network to all stations.....	Variable
Workstations (2 per fire station @ $2,000 per unit, plus HQ)	$34,000
Wireless modems, 1 per apparatus, inspector, supervisor @ $1000 ea	$215,000
Wireless connection service @ $600/year/unit	$120,000

Software for analysis and report production $10,000

Large-scale plotter/printer $15,000

Unit Manager (Senior GIS and Database Analyst) $60,000

Database Analyst/Statistician $50,000

GIS Technician $40,000

Analytical software $50,000

Clerical Support $25,000

3.10.2. AVERAGE

A standardized suite of data collection software is used to capture the data described above. Some data must be entered more than once, or transcribed from paper to electronic format by additional personnel. Data is aggregated periodically (monthly, quarterly) and reports are prepared. There is no live connection between the CAD system and the records management system. The records management system is limited to recording minimum required fire and EMS data (VFIRS and Uniform Pre-hospital Data Set). There is no centralized data and analysis unit, so conflicting or confusing information is sometimes produced by different analysts, using different protocols. Analysis is performed by personnel whose primary training and experience is not that of public safety analysis (e.g., fire and EMS personnel with hobbyist-level interest in computers, statistics, or GIS). There is no real-time connection between producers of data (firefighters, EMTs, fire marshals, etc.) and the database.

3.10.2.1. FINANCIAL IMPLICATIONS

Records Management System ..... $ 750,000

(likely to cost more than centralized due to duplication, loss of discounts)

Annual licenses and maintenance $75,000

Workstations (2 per fire station @ $2,000 per unit, plus HQ) $36,000

Software for analysis and report production $10,000

Large-scale plotter/printer $15,000

Personnel costs for persons performing analysis $50,000

Clerical Support (more required due to duplicate data entry) $100,000

3.10.3. MINIMUM

A series of separate databases are procured and utilized by all of the separate organizations in the County. Data is aggregated periodically (monthly, quarterly) and reports are prepared, with difficulty.

The records management system is limited to recording minimum required fire and EMS data (VFIRS and Uniform Pre-hospital Data Set). There is no centralized data and analysis unit, so conflicting or confusing information is sometimes produced by different analysts using different protocols. Analysis is performed by personnel whose primary training and experience is not that of public safety analysis (e.g., fire and EMS personnel with hobbyist-level interest in computers, statistics, or GIS). There is no real-time connection between producers of data (firefighters, EMTs, fire marshals, etc.) and the database.

3.10.3.1. FINANCIAL IMPLICATIONS

Records Management System ..... $ 750,000

(likely to cost more than centralized due to duplication, loss of discounts)

Annual licenses and maintenance..... $75,000

Software for analysis and report production..... $10,000

Clerical Support (more required due to duplicate data entry) $100,000

3.10.4. RECOMMENDATION FOR DATA AND EVALUATION SERVICE LEVEL

EMSSTAR recommends: "**High**"

Rationale:

The citizens of Loudoun County are, perhaps without being aware of it, sophisticated consumers of fire and rescue services. As was established by private citizens, business leaders, and public officials during the assessment process, these citizens expect that when they dial 911, they will receive a speedy, appropriate, and professional response. In order for those responsible for service delivery to assure that this level of service, timely, accurate and complete information must be made available to planners, decision-makers, and those responsible for daily operations. Only a sophisticated, professionally run, "real time" data collection, analysis, and presentation system can provide that level and quality of information. Moreover, the limited savings (if any) of lower levels versus the "high" level make the answer to this option even more clear. Collecting and analyzing data "separately" versus doing it on a centralized basis will result in an inferior product at the same or higher cost.

3.11. FIRE AND EMS OPERATIONS AND TRANSPORT SERVICE LEVELS

This attribute addresses the primary mission of the fire and rescue Department, which is to provide fire and emergency medical services to the citizens of the County. Any department that delivers these services understands the importance of reliable and consistent levels of service. When a citizen places a call to the Emergency Communications Center, a whole series of events begins. Each of

these events must work cohesively and as a group in order to allow for a quick and efficient response to the scene of any emergency. Delivering this service results from the teamwork of communications officers and the responding units.

The goal of any system is to reduce the amount of time that it takes from the time the emergency is identified, until the fire and EMS units are on the scene. At that point, the level of training and the expertise of the personnel become the deciding factor for the outcome of the emergency. The key to this attribute is the balance of a well-trained, fast response system, with the budgetary requirements to fund the necessary equipment, training, and personnel.

3.11.1. HIGH

Response standards are specific to areas of the County based on a comprehensive risk assessment. All stations are staffed on a 24-hour per day basis with a combination of volunteer and career personnel. At a minimum, each station has a primary piece of apparatus staffed to include an engine, tanker, and medic unit. Minimum staffing levels are four people for each engine, ladder truck and heavy rescue squad. Medic units and tankers have a staffing level of two personnel. All engine companies have at least one advanced life support provider on duty at all times. On all advanced life support calls, a minimum of one paramedic and one cardiac technician are dispatched on various pieces of equipment. Basic life support units are staffed by two EMTs. Two command officers are on duty twenty-four hours per day and respond to all multiple unit responses.

A standard structure fire response gets an automatic assignment of 19 firefighters and command personnel (CFAI). A high-risk facility as identified during the risk assessment, generates a response of 25 people. All life threatening calls get a minimum of five personnel, two of which are advanced life support trained. All firefighting personnel are trained to the Firefighter II level and are certified emergency medical technicians. EMS personnel are trained to a Firefighter I level and are certified emergency medical technicians. All command officers are trained to the appropriate NFPA 1021 officer level appropriate for their rank.

EMS calls have a response time goal for basic life support personnel to arrive, followed by advanced life support trained and equipped personnel that is met 90% of the time. Basic Life Support incidents have a BLS ambulance on the scene in pre-determined time frames 90% of the time Fire responses have a goal of the first due engine arriving within the prescribed standard of cover time frames with an effective response force arriving within prescribed time frames 90% of the time (CAAS). The closest staffed unit is dispatched regardless of the location of the vehicle. Volunteer personnel sign up for duty shifts and fulfill their duty as a physical standby. Career personnel supplement volunteer responses when response analysis indicates that inadequate volunteers are available for consistent responses.

3.11.1.1. FINANCIAL IMPLICATIONS

Staffing cost:

Each firefighter required to supplement volunteers $54,800

Each engine, ladder truck, or heavy rescue staffed during daytime hours only (funding for seven people to maintain four on duty at all times. $350,000

Each engine, ladder truck, or heavy rescue squad (this funds 5 people per shift X 3 shifts) $750,000

Each medic unit and tanker staffing on a 24 hour basis. $300,000

Each command officer $68,500

Each command position on a 24-hour basis $274,000

Software staffing package for volunteers to manage duty shift assignments. $100,000

3.11.2. AVERAGE

There is a standard response assignment Countywide based on the type of call received. Target hazards in all areas of the County have a separate and unique response assignment based on a risk assessment for those properties. There is an established level of service based on rural response districts and urban response districts. All urban stations are staffed by physical stand-by 24 hours per day, seven days per week by a combination of volunteer and career personnel. Rural stations are staffed as dictated by the risk assessment of the response district. Strategic locations within the rural response districts have staffing on a 24 hour basis, by volunteers and career personnel, in order to guarantee that units are available to respond immediately throughout the County, without long travel distances and thus long response times.

Engine and ladders trucks are staffed with a minimum of four people. Heavy Rescue's are staffed with three people, medic units with two people and tankers with one person. All engines in 24-hour staffed stations without an assigned ambulance has an advanced life support provider on duty at all times. A response to a residential structure will result in 15 firefighters on the initial dispatch assignment. High-risk assignments will have 20 firefighters dispatched on the initial assignment (NFPA, CFAI). Advanced life support calls will have five personnel dispatched on the initial assignment. A command officer responds to all working incidents and all high-risk occupancies 24 hours per day, seven days per week.

A minimum of one ALS personnel trained to the paramedic level is dispatched to all advanced life support calls. A minimum of two certified EMTs respond on all Basic Life Support incidents (CAAS). All fire personnel are trained to a minimum level as determined by the Department. EMS personnel are trained to the emergency medical technician level. Command officers operating on a Countywide basis are trained to a level as set forth by the Department.

In urban areas for EMS calls, basic life support will arrive within the time frames established by the standard of cover and advanced life support personnel and equipment will arrive within prescribed time frames 85% of the time on all advanced life support incidents. Basic life support incidents have a response goal established and met 85% of the time. In urban areas for fire responses, the first due engine will arrive in accordance with the standard of cover from time of dispatch, and a full response force will arrive within prescribed time frames 85% of the time. All rural districts will have an additional time frame response time goal to arrive and to assemble a full response force.

The closest staffed unit is always dispatched to the initial call for service. All personnel schedule their time in advance to assure coverage at stations that require 24-hour in-station coverage. Career personnel are assigned to stations based on response time analysis conducted quarterly.

3.11.2.1. FINANCIAL IMPLICATIONS

Financial implications are similar to the high level of service. The significant difference is that not all stations are staffed as required in the high level of service. Further, the response time difference will reduce the need for personnel by establishing longer response times.

All other expenses will be the same amount per person or unit.

3.11.3. MINIMUM

There is a standard response assignment Countywide based on the type of call received. Response assignments are based on historical recall, and not on risk assessments or valid data. Levels of service vary according to the volunteer district and station that services the community. Career personnel staff various stations during daytime periods Monday through Friday. Career staff is added when requested by the volunteer stations. Response time analysis is not the driving force in the placement of career personnel.

Engines and ladders trucks are staffed with a minimum of three people. Heavy Rescue's are staffed with two people, medic units with two people and tankers with one person. A response to a residential structure will result in 15 firefighters on the initial dispatch assignment. High-risk assignments will have 18 firefighters dispatched on the initial assignment (NFPA, CFAI). Advanced life support calls will have two personnel dispatched on the initial assignment. Career command officers respond to all working incidents and all high-risk occupancies during daytime hours only. Volunteer command officers respond on a battalion basis on all multi-company responses 24 hours per day, seven days per week.

A minimum of one ALS personnel trained to the cardiac technician level is dispatched to all advanced life support calls. All fire personnel are trained to a minimum level as determined by the Department. EMS personnel are trained to the emergency medical technician level. Basic life support calls have a minimum response of two EMTs. Command officers operating on a Countywide basis are trained to a level as set forth by the volunteer department.

In urban areas for EMS calls, basic life support will arrive in accordance with the standard of cover document from time of dispatch, and advanced life support personnel and equipment will arrive within prescribed time frames 80% of the time for all advanced life support incidents. Basic life support incidents have a response goal that is met 80% of the time (CAAS, AHA). In urban areas for fire responses, the first due engine will arrive within the time frames as established by the standard of cover document from time of dispatch, and a full response force will arrive within prescribed time frames from time of dispatch, 80% of the time. All rural districts will have an additional response times on each response time goal to arrive and to assemble a full response force.

The closest station is dispatched initially to all calls, regardless of staffing levels. The next closest station is dispatched if the first due company is not responding within 4 minutes after the initial dispatch. Volunteer personnel are assigned to duty teams for their stations, and are responsible for

responding to all calls for service during their duty assignment. No physical stand-by is required, as long as the units are meeting the response time goals. A comprehensive response time evaluation is completed on a yearly basis.

3.11.3.1. FINANCIAL IMPLICATIONS

The cost per unit is the same as the high level. The number of personnel required under this level is unknown, but dependent on the actions of the volunteer companies. The 80% compliance rate reduces the expectations for the stations and most can meet the requirement. Thus, the cost impact for this level of service is minimal.

3.11.4. RECOMMENDATION FOR FIRE AND EMS OPERATIONS AND TRANSPORT SERVICE LEVELS

EMSSTAR Recommends: **"Average"**

This level is one that establishes a balance between service to the citizens, funding, and the continued use of volunteers. Obviously, the high level of service is a system that puts service delivery as the number one goal. However, the cost to reach that goal is not efficient use of existing resources, nor does EMSSTAR believe it is in the best interest of the system if the critical volunteer attribute of the systems is to be maintained.

The establishment of urban and rural service zones recognizes the differences in the response areas that each type of service zones has. It is unrealistic to think that a rural fire or EMS station can respond as rapidly as a station located in the urban areas of the County. Thus, this level gives the ability to recognize the differences and to have different levels of staffing and of response time goals for the two different areas. In the arena of staffing, this level realizes the need for immediate response to the urban areas where the majority of the population resides, and likewise, where the majority of the high-risk occupancies are located. The rural staffing plan allows for rural stations to maintain their current duty assignments, but places a safety valve into the system. Based on a good risk assessment, stations strategically located throughout the rural areas would have physical stand-by on a 24-hour basis. The purpose of this stand-by is to assure that personnel are continuously available in all parts of the County. This reduces the travel time for responding staffed units, and yet does not place undue burdens on all rural stations.

The staffing levels indicated are within normal accepted practices and allow for sufficient personnel to operate on the fireground. This response pattern allows for: an incident commander, a pump operator, two attack firefighters, two rescue firefighters, two firefighters for search, two for utility control, ventilation, and salvage and overhaul, and two firefighters in reserve for additional assignments.

A response of five people to advanced life support calls is an industry-accepted practice in fire and rescue combination systems. Two people cannot deliver adequate patient care to a critical patient while carrying equipment and transporting a critical patient down or up any stairways or incline. It is

far better to have personnel on the scene and not be needed than to need the personnel and not have them available.

The response times as indicated meet the American Heart Association standards for the delivery of advanced life support care to someone that is experiencing sudden cardiac death. The goal is to intervene in patients before they reach the point of sudden cardiac death and to begin treatment that will prevent them from going into cardiac arrest. Response time for fire incidents is based on the measurement of the time the call is dispatched until the units arrive on the scene. It is critical to have a fast response time to intervene in any fire situation prior to flashover. Flashover is the point at which a fire is basically consuming everything in the room of origin. The six-minute time frame is at the upper edge of that time, and thus is the maximum that can be recommended for fire response times. In the rural areas, the times are expanded. This must take into account the possibility of greater fire damage in the rural areas. On balance, the property value is such that the majority of the responses will be in single-family residential properties, and thus a less likelihood of fire spread as a result of longer response times.

Deploying personnel based on response analysis is crucial to any viable fire and EMS system. Decisions should be made based on the ability of the system to provide reliable and consistent services to the citizens. This level determines the need for additional career personnel based on objective data and not based on the perceived need or total failure of the response system in a particular area. Scheduling volunteer staff allows the system to know what future staffing patterns will be. The minimal level of service does not require volunteers to schedule duty time, but rather relies on assigned duty nights. In order to assure the staffing levels as indicated it is imperative that command officers know the staffing levels that will be present for all duty shifts. Failure to require scheduled physical duty assignments will result in a lack of consistent and reliable service.

This level will allow Loudoun County to continue to utilize volunteers as an intricate part of the emergency response system, and yet assure responses to all emergencies throughout the County.

3.12. PUBLIC INFORMATION AND EDUCATION SERVICE LEVELS

This attribute provides for essential information to be conveyed to the public at large: the business community, schools, citizens, and even visitors. The effective public information and education (PI&E) program is a critical activity actively integrated into the functions of an emergency response agency. Through analysis of information about the public health threats and physical risks in the community, PI&E programs are selected, or developed where they do not exist, and deployed in the most effective and efficient manner possible. New technologies and techniques proven in other jurisdictions are explored and utilized when advantageous. A collaborative approach, utilizing materials, expertise, and guidance from other agencies can enhance the message and its retention by citizens, all of whom are potential consumers of emergency care and disaster response services in the jurisdiction. The focus of a PI&E program is more diverse than prevention; its messages can be targeted to special populations, such as prospective volunteers, and consumers with a high probability of using the system, with tools such as bystander care or “make the right call” information about when to use emergency numbers.

3.12.1. HIGH

There is an established Deputy Chief level position and support staff, including two planners, two investigators, and two educators who design and tailor PI&E programs for delivery throughout the year. Target audiences and messages are selected based on intense analysis of Countywide fire, emergency medical and disaster responses, as well as probabilistic risk assessment of infrequent but potentially catastrophic events (e.g., floods). Fire and EMS personnel, including volunteers, become messengers of PI&E, and participate in public information activities. All Fire and EMS providers are trained to observe and detect hazards in residences, and provide information on community resources to the residents. Recruitment and basic Fire and EMS system information is embraced as a major theme to facilitate volunteering in the community and awareness of community members about the importance and role of the Fire and EMS system and the volunteers who serve. Unique population needs and opportunities for collaboration are identified with input from other public agencies, such as those engaged in the provision of mental health and public assistance. Materials are age-appropriate, and several programs are delivered using advanced technology and devices, such as monitors above gas pumps and check out lines, and selected media interventions when appropriate. Success in delivery of information, including measures of information retention, and factors indicating positive behavior effects, such as an observed increase in the number of children wearing bicycle helmets, is also measured. Comprehensive analysis (determination of most frequent causes for fire and EMS response) is performed.

3.12.1.1. FINANCIAL IMPLICATIONS

Deputy Chief-(I FTE) $100,000

Professional and Administrative Support Staff (6 FTE's) $228,000

Operating Expenses $96,000

3.12.2. AVERAGE

PI&E is assigned as a priority to the Fire Prevention Division, which is able to hire one planner and one educator devoted to emergency medical and emergency management PI&E functions. Two fire inspectors are trained in health hazard and injury risk inspections, which are routinely performed at playgrounds, swimming areas, and any residence when alerted by a fire or EMS crew and the homeowner is receptive to the service. At least three major campaigns are conducted in the course of the year, one of which is devoted to recruitment of volunteers. Minimal analysis (determination of most frequent causes for fire and EMS response) is performed, and only anecdotal measures of success are documented.

3.12.2.1. FINANCIAL IMPLICATIONS

Planner and Educator (2 FTE's) $80,000

Operating Expenses $32,000

3.12.3. MINIMUM

The Chief delegates the task of PI&E to the Deputy Chief already responsible for fire prevention. An educator is hired to develop fire and EMS specific materials and to incorporate prepared emergency management materials available from Commonwealth and federal sources. Fire and EMS providers play no formal role in PI&E, and any community-based initiatives are done sporadically and without benefit of use of other County-specific materials developed elsewhere. Topics are selected based on availability and ease of implementation, and have no correlation to actual health or safety risks in the County. Recruitment brochures are updated once a year.

3.12.3.1. FINANCIAL IMPLICATIONS

Educator $40,000

Operating Expenses $16,000

3.12.4. RECOMMENDATION FOR PUBLIC EDUCATION AND INFORMATION SERVICE LEVEL

EMSSTAR recommends: "**High"**

Rationale:

The striking success of the Department Fire Prevention program and public safety education sets a benchmark of excellent performance that can and should be applied to other unresolved and unmitigated risks present in the community. Medical emergencies and injuries place a constant demand on the EMS and rescue agencies within the County, and prudent resource management would make every attempt to reduce that demand. On a long-term basis, it would be difficult to defend the expenditure for fire prevention, despite the potential for high-dollar property loss, while the opportunity to save lives and prevent disability through emergency medical and emergency management PI&E went untended. The EMS Agenda for the Future, as well as the most current curricula used to teach EMS providers at all levels incorporates PI&E as a formal and continuous activity expected of emergency medical services systems.

3.13. FIRE PREVENTION SERVICE LEVELS

This section addresses the attribute of Fire Prevention. This attribute is one of the most proactive activities undertaken by a fire and rescue department. Every fire prevented is a tragedy that the

community does not have to endure. Preventing a fire avoids an economic loss to the owners, as well as reducing the potential for a tax revenue loss by the County should the structure not be rebuilt. Unfortunately, it is extremely difficult to put a value on fires or emergencies that are prevented. Many methods have been used over the years, but no one method survives scrutiny and serves as a reliable method to measure the fire prevention program.

A good fire prevention program has multiple facets. These facets all come together to reduce the potential of fire through design, inspection, and post fire investigation to determine what could have been done differently to eliminate the fire danger, or to reduce the amount of loss due to an actual fire. Fire investigations also serve to determine social problems that may occur in the County. Nationally, statistics show that juveniles are responsible for up to 50% of all arson or suspicious fires. A thorough investigation process can identify those trends and assist the County in having a proactive response to the juvenile fire-setter problem.

Successful fire prevention efforts will reap long-term benefits for all citizens of the County. Overall, fire prevention functions are critical to the successful reduction of fire injuries and deaths, the destruction of property, and the loss of economic resources.

3.13.1. HIGH

A high level of service of fire prevention will have many long lasting impacts on the community. It will have multiple facets that must come together throughout the life of any property in the County. All inspectable occupancies are inspected a minimum of once per year. Inspections are entered and maintained on a hand held computer system. All re-inspections are completed within 60 days and non-compliant owners are cited in accordance with the fire prevention code. A system is in place in conjunction with the court system to direct all fines and penalties to the fire prevention budget for public education purposes. All non-life-threatening complaints are handled within 24 hours of receipt of complaint.

Engine company personnel perform inspections on low risk and mercantile properties in their respective response districts. All new construction is inspected by a fire inspector and the local Fire Company prior to a certificate of occupancy being issued. A computerized system is in place to immediately notify inspectors and suppression personnel when a building is under construction and whenever a change of occupancy or use occurs in a structure.

A licensed fire protection engineer is employed by the Department. Working in conjunction with the building official, all fire protection plans are reviewed by the fire marshal's office to assure that fire safe buildings are under construction. Fire prevention permits are issued by the Department on-site through a hand held computer system. Revenues are generated through the issuance of permits as allowed under the fire prevention code.

All inspectors are trained to the NFPA Level 1033, with summons powers. All company officers are trained to the NFPA 1033 Level. All career and volunteer firefighters are trained in basic engine company inspections. All fire investigators are trained to the 1033 and 1031 Level, and have full police powers and are equipped as law enforcement personnel. All company officers are trained in basic fire cause determination.

A certified fire investigator investigates all suspicious fires. All investigations of suspicious fires are begun prior to the fire suppression forces leaving the scene. Resources are adequate for the follow through of all suspicious fires in the County. Support personnel are in place to enter information and to transcribe interviews within a timely fashion.

A dedicated juvenile firesetter investigator is on staff and serves as the lead investigator on all juvenile related fire incidents. All investigators are trained to recognize juvenile firesetter issues and pass the information to the assigned juvenile investigator. A comprehensive juvenile firesetter intervention program is in place. Resources are coordinated with the court system, mental health, and school systems in order to reduce the incidence of juvenile firesetting.

3.13.1.1. FINANCIAL IMPLICATIONS

The cost to meet this level of service will be dependent on establishing the workload for the inspectors. This will require several personnel in order to meet the required level of service. The following costs are based on individual personnel cost

Fire Inspector, each	$57,000
Fire Investigator, each	$55,000
Equipment startup cost per person	$50,000
Fire Protection Engineer	$80,000
Software for inspections	$100,000
Hand held computers, each	$10,000
Juvenile Firesetter Program	$50,000
Support staff -2 clerical	$80,000
Support office equipment	$20,000
Inspector training	$30,000
Fire Cause Determination Training	$30,000

3.13.2. AVERAGE

This level will realize inspection of inspectable properties on a one, two, or three-year basis, determined by type of occupancy. Engine companies perform inspections of low risk occupancies. All inspections are completed on paper, and then entered into a computer system at the fire marshal's office or at the fire station. A software system is in place to identify fire prevention permits and to notify inspectors of upcoming inspections that must be performed in order to get the necessary permits. Permits are issued from the central office after inspections are completed.

A fire protection engineer is on staff in the building official's office. The fire protection engineer coordinates plan reviews with the fire marshal's office and assures that fire protection systems are

adequate to meet the needs of the Department. Non-life-threatening complaints are handled within 48 hours. The fire marshal's office maintains a list of certificates of occupancy issued and businesses are inspected within six months of occupancy to establish a record.

All inspectors are trained to the NFPA 1033 Level, with full summons powers. All company officers and career and volunteer firefighters are trained in conducting basic engine company inspections. All fire investigators are trained as NFPA 1033 and 1031. Fire investigators have full police powers and are equipped as full law enforcement officers. All company officers are trained in fire cause determination.

The fire marshal's office investigates all suspicious fires. Investigations are begun prior to fire suppression personnel leaving any scene. Resources are adequate for the follow through of all suspicious fires in the County. Support personnel are in place to enter information and to transcribe interviews within a timely fashion.

A dedicated juvenile firesetter investigator is on staff and serves as the lead investigator on all juvenile related fire incidents. All investigators are trained to recognize juvenile firesetter issues and then pass the information on to the assigned juvenile investigator. There is no structured juvenile firesetter program. Juvenile firesetters are referred to social service agencies such as mental health.

3.13.2.1. FINANCIAL IMPLICATIONS

Cost for this level of service are slightly lower than the high level of service. However, the incremental cost is insignificant when considering the additional service levels that are indicated in the high level of service. The following items are required to meet this service level. The number of personnel will vary depending on the needs of the County. However, the increased inspection time will reduce the number of inspectors needed.

Fire Inspector, each	$57,000
Fire Investigator, each	$55,000
Equipment startup cost per person	$50,000
Fire Protection Engineer	$80,000
Software for inspections	$100,000
Support staff -2 clerical	$80,000
Support office equipment	$20,000
Inspector training	$10,000
Fire Cause Determination Training	$30,000

3.13.3. MINIMUM

This level of service will result in fire prevention inspections being completed every three years for the majority of County businesses. Special risk and high-risk occupancies are inspected on a yearly basis. All inspections are maintained on a paper system and entered into a basic database software program. Complaints to non-life-threatening situations are handled within 48 hours.

A fire protection technician that has special training in the area of plan reviews and fire protection systems reviews plans for new construction. Dependence is placed upon the design engineers to certify that fire protection systems will meet all applicable codes that address the proposed systems. The fire marshal's office maintains files on all new occupancies and forwards the information to fire station personnel as needed. Inspections are scheduled three years from the time of certificate of occupancy.

Fire prevention permits are only issued for high hazard operations and are renewed when inspections are completed.

All inspectors are trained to the NFPA 1033 Level with full summons powers. Company officers and volunteer and career firefighters are trained in the basic firefighter training programs in fire inspection techniques. Fire suppression personnel only assist inspectors with fire inspections upon request. All fire investigators are trained to NFPA 1033 and 1031 standards. Investigators have full police powers and are fully equipped as law enforcement officers.

All fire investigations are begun prior to fire suppression forces leaving the scene if at all possible. Follow through is made on large loss fires or where injury or death has occurred. Other arson cases are placed in an inactive file if no suspect is developed with seven days of the time of the fire incident.

Fire inspectors and investigators enter their own reports and inspections into the database program. The investigator on call handles all juvenile related incidents. Juvenile interactions are undertaken only in an enforcement mode. Referrals are dependent upon the juvenile justice system.

3.13.3.1. FINANCIAL IMPLICATIONS

This level of service results in a greatly reduced cost factor. Given the three-year inspection period, the number of additional personnel needed is minimal. Projected costs are outlined below and can be contrasted to the two other service levels.

Fire Inspector, each $57,000

Fire Investigator, each $55,000

Equipment startup cost per person $50,000

3.13.4. RECOMMENDATION FOR FIRE PREVENTION SERVICE LEVEL

EMSSTAR recommends: **"High"**

Rationale:

The best investment that any local government can make is to prevent an emergency from happening. The high level of service is one that can have long-term returns on the County's investment in reducing life and property loss.

This level approaches fire prevention from a total system standpoint. Inspections are integrated with full time inspectors and with trained engine company personnel. This utilizes down time that many firefighters have when waiting at the station for an emergency incident. By using firefighting personnel to conduct basic inspections, the personnel are ready to respond to emergencies, and are able to familiarize themselves with the buildings in their response area. Inspectors are then able to concentrate on inspecting buildings that typically have more complicated fire protection systems. By training company officers as full inspectors, they will have the knowledge necessary to discuss violations with the business owner in an educational approach. This approach may face initial opposition from firefighters and will take a strong administrator to be successful.

An automated inspection system will integrate with other data management systems in the Department to give inspectors up to date information on all businesses in the County. The system should have the ability to tie into other County systems and will assure that information is shared between the building official's office and the fire marshal's office.

The institution of a certified fire protection engineer in the fire marshal's office greatly enhances the ability of the Department to positively impact new construction. Commonwealth law assigns the duty of building inspections to the building official. In order for this recommendation to work, the building official must be willing to administratively assign the responsibility for fire protection systems to the fire marshals office. Ultimately, the building official is responsible for final determinations, but the authority can be granted to the fire marshal's office. This will serve to greatly enhance the flow of information about new construction in the County.

Training requirements as set forth in this service level are both achievable and recommended. The majority of firefighters gravitate to fire suppression activity. Requiring all firefighters to take a course in fire inspections will serve to start a process of future firefighters in the County to see fire prevention as much a part of the job of firefighting as combating a fire. Training company officers in fire cause determination can assist in reducing the down time for an investigator to determine the cause of an easily identifiable accidental fire.

Resources are critical to any law enforcement operation. Accurately entering reports and transcribing tapes are crucial to the successful prosecution of arson cases. This level of service would place adequate support personnel in the fire marshal's office to fulfill the staff support role.

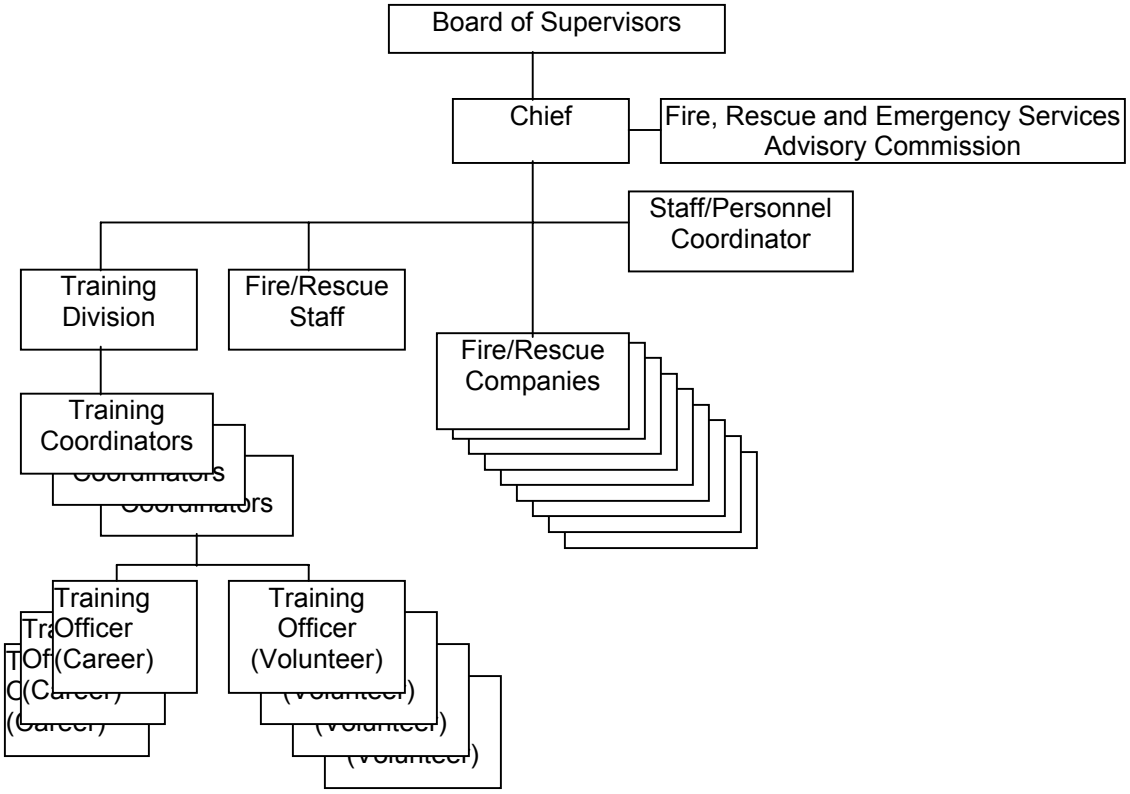
Lastly, juvenile firesetters are a national problem. Juveniles set over 50% of suspicious fires. Many of these juveniles are simply living out a natural attraction to fire. Unfortunately, death and destruction can result from that natural attraction. The implementation of a comprehensive juvenile firesetter program can serve as a tool that local fire, police, school, and juvenile justice officials can use to reduce the incidence of repeat juvenile firesetters. Programs that have been implemented in other localities have excellent results and a low rate of recidivism.

Adoption of this level of service will create an environment that will put a premium on preventing a fire and on building fire safe buildings in the County.

3.14. TRAINING SERVICE LEVELS

This attribute addresses the training function. The proper instruction of personnel in the areas of fire, rescue and EMS represents an essential cornerstone in the foundation of any highly respected public safety service Training includes the orientation and training of new fire and rescue personnel, career and volunteer, basic and advanced firefighter and fire officer training, management training, basic life and advanced life support training, and certification and specialized training. The training model

envisions use of the training center(s), specialized classes, in-service training, distance learning, use of the community college system, Commonwealth and national training academies, and other arranged classes. The training system envisions the adoption and implementation of basic certification requirements for career and volunteer fire/rescue personnel, and the implementation of a professional development plan for both career and volunteer personnel. Because of the size of the combined agency, most basic skills and management classes can be offered in-house. Because of the proximity of the National Fire Academy, we recommend that much of the advanced training needed in the Loudoun County Fire and Rescue Department be obtained through that facility.



***Organizational chart is only to denote training relationships and is not the official organizational chart that is being recommended.

Training Coordinators – Responsible for career/professional development plans, records, scheduling, training facility and equipment utilization, supervision of programs and training officers. Equity of program quality and quantity are essential and is the responsibility of the training coordinators to ensure. This individual schedules training of all EMS personnel.

Training Officers – Deliver course and training programs, assist company officers (career and volunteer) in delivery of company and team training, maintains training facilities and equipment, maintains training records, develops courses, performs evaluations of training and skills, conducts research and development and performs other training and educational duties as assigned.

3.14.1. HIGH

Career development and training are organized as a separate division answering to the Loudoun County Fire and Rescue Chief. A senior chief officer reporting directly to the Chief heads the division. The chief of training is responsible for the design, development and delivery of training and career development for volunteer and career Department personnel. Responsibility for implementation and evaluation of personnel already certified as firefighters and assigned to stations/shifts (career and volunteer) continues to be the supervisors and chief officers to whose companies and battalions they are assigned. The Training Chief and staff will develop training protocols, policies, schedules, procedures, and evaluation processes for use by company officers and multi-company supervisors for both the volunteer and career service personnel. The training staff will provide support material and training aids to the in-service training program and will assist company and battalion officers in the delivery of training where resources and staffing permit.

The training staff will develop and implement a career/professional development plan that provides career development and mapping for both volunteer and career personnel. The career/professional development program will have at least two categories. One category will provide opportunities for personnel to gain competence at their current level of service and to prepare for their future advancement to the next positions in the organization in the areas of fire EMS and emergency management. The second category of training is a maintenance level that allows persons that do not desire advancement to maintain the basic skills necessary for continuing competence as firefighters and EMS personnel. These may include re-certifications, psychomotor skills exercises and company and individual drills, in the area of fire and EMS.

The professional development programs shall be formatted for the delivery to career and volunteer members to ensure intra-operability and intra-changeability of volunteer and career Department staff members of equal rank. At a minimum, the operations career/professional development plan should include training for firefighters (multiple levels based on differing levels of firefighter competence, not differences in career and volunteer firefighter training.) All training is based on the concept that career and volunteer training includes the same materials, competencies, and evaluations, (albeit modified in presentation schedules due to differing training schedules for both groups), driver-engineer, company officer, multiple company supervisor, instructor, inspector, educator, and specialist-technician training.

Beyond entry level requirements and classes done for special certification, each career firefighter and EMS professional should receive approximately 20 hours of in-service training per month. In addition each volunteer should strive to match that amount of time, but in no case have less than 10 hours of training per month. The County should consider alternative ways to deliver courses off-site and to the volunteers spread throughout the County. Use of cable, Internet, and other creative delivery techniques should be explored. This would be particularly useful for volunteer training, as it would allow much of the instruction to be done at times convenient to the volunteer members This would reserve training meetings to those activities requiring actual use of equipment and people or those activities that require multiple people to perform.

The Training Division should be staffed by a manager/training chief and training coordinators that focus on scheduling all regular, in-service, recurring, re-certifications, and any other developmental training, and training officers who are responsible for training delivery, monitoring and evaluating company training, providing support for training activities, and maintaining Department training

facilities and equipment. The training coordinators will need to be full-time staff members. The training officers should be a mix of volunteer and career personnel and should be used interchangeably as much as possible based on training requirements and time available. In the high service level volunteer training officers should be remunerated at an hourly rate for hours worked above regular volunteer duties or provided a stipend to recognize the higher level of additional commitment this work will require.

A full service EMS training section should be incorporated under the training chief. This section should have a person that is certified beyond the level of a field advanced life support provider that serves as the advanced life support coordinator. Staffing should be in place to allow for training at all EMS certification levels in accordance with Commonwealth Laws the Virginia Division of Emergency Medical Services requirements. Training should also be in place to meet national standards for advanced life support to include: Advanced Cardiac Life Support, Pediatric Advance Life Support, Basic Trauma Life Support, and other similar training programs. Training will be available at basic and advanced levels during day and night hours to allow for more personnel to be trained as emergency medical services providers. There is an established and formal relationship with a university based emergency medicine program that offers a Bachelor degree in Emergency Medicine, Emergency Medical Services or related area.

Continuing education will be available at the training academy and all County personnel will be able to maintain their medical skills and continuing education at no cost to the provider.

3.14.1.1. FINANCIAL IMPLICATIONS:

In the training model we do not include the indirect costs of training. Thus none of the salaries of those being trained, either career or volunteers who may be giving up potential income during the training periods, are included.

Assignment of a training director/manager/chief at the pay range of the level of chief officer immediately beneath the Department Chief, two or three training coordinators at the senior captain or battalion chief level and five or six training officers at the company officer level. At least half the training officers and one of the training coordinators should be volunteers and costs would be a stipend based on an hourly rate for their position equivalent in the career service. Based on the observations made about the disparity in training and skills there is a significant need for an investment in training hours over the next several years. It is estimated that a training staff of 8-10 FTE's (6 Training Officers, 3 Training Coordinators, Training Chief) will be required. They will implement, monitor, evaluate, and record the professional development training envisioned for the Department in the area of fire service training. Emergency medical services training personnel will be required to teach basic and advanced life support classes. A minimum EMS training staff of 5 to 6 FTE's will be required to fulfill this role. Each of the training staff will likely have responsibilities for delivery of services in the field therefore will require a vehicle and support, office space and support, and training materials. Estimated costs about $1.2 million per year. This cost can be somewhat offset by utilizing the training officers as sector commanders and safety officers on multiple company calls. This will also allow them to evaluate training levels at actual emergency scenes.

3.14.2. AVERAGE

Professional development and training are organized as a separate division answering to the Loudoun County Fire and Rescue Chief. A senior chief officer heads the division. The chief of training is responsible for planning, coordination, and implementation of training and career development for volunteer and career Department personnel. Responsibility for implementation and evaluation of personnel already certified as firefighters and assigned to stations/shifts (career and volunteer) is primarily remanded to the supervisors and chief officers to whose companies and battalions they are assigned. The training chief and staff will develop training protocols, schedules, policies, procedures, and evaluation processes for use by company officers and multi-company supervisors for both the volunteer and career service personnel. The training staff will provide support material and training aids to the in-service training program and will assist company and battalion officers in delivery of training where resources and staffing permit.

The training staff will develop and implement a career/professional development plan that provides career development and mapping for both volunteer and career personnel. The professional development programs will have at least two categories. One category will provide opportunities for personnel to gain competence at their current level of service and to prepare for their future advancement in the organization. The second category of training is maintenance level that allows persons that do not desire advancement to maintain basic skills necessary for continuing competence as firefighters and EMS personnel. These may include, but are not limited to, re-certifications, psychomotor skills exercises and company and individual drills.

The professional development programs shall be formatted for the delivery to career and volunteers to ensure intra-operability and intra-changeability of volunteer and career fire staff members of equal rank. As a minimum, the operations professional development plan should include training for firefighters (multiple levels based on differing levels of firefighter competence, not differences in career and volunteer firefighter and EMS training – all instruction is based on the concept that career and volunteer training includes the same materials, competencies, and evaluations, albeit modified in presentation schedules due to differing training schedules for both groups), driver-engineer, company officer, multiple company supervisor, instructor, inspector, educator, and specialist-technician training.

Beyond entry level requirements and classes done for special certification, the career firefighter should receive about 20 hours of in-service training per month and volunteers should come as close to that as possible, but must have at least 10 hours of training per month. The County should consider alternative ways to deliver courses off-site and to the volunteers scattered throughout the region. Use of cable, Internet, and other imaginative delivery techniques should be explored. This would be particularly useful for volunteer training as it would allow much of the training to be done at times convenient to the volunteer member and would reserve training meetings to those activities requiring actual manipulation of equipment and people or those that require multiple people of crews to perform.

The Training Division shall be staffed by a manager/training chief and training coordinators that focus on scheduling all regular, in-service, recurring, re-certifications, and any other developmental training, and training officers who are responsible for training delivery, monitoring and evaluating company training, providing support for training activities, and maintaining Department training facilities and equipment. The training coordinators and training officers will need to be full-time staff members. The major difference between high and average is the utilization of volunteer training staff as training officers.

An EMS training section shall be incorporated under the training chief. This section should have a person that is certified as a paramedic and is capable of conducting continuing education programs for

certified providers. Staffing should be in place to allow for training up to the cardiac technician level in accordance with the Virginia Division of Emergency Medical Services. Training should also be in place to meet national standards for Advanced Cardiac Life Support and Pediatric Advance Life Support. Training will be available at basic and advanced levels during day and night hours to allow for more personnel to be trained as emergency medical services providers.

Continuing education will be available at the training academy and all County personnel will be able to maintain their medical skills and continuing education at no cost to the provider.

3.14.2.1. FINANCIAL IMPLICATIONS:

This option may actually be more costly than the high model because it utilizes all career personnel as the training staff rather than paying over half the training staff on an hourly or stipend basis. There is no difference in training requirements or hours. Estimated cost $1.3 million.

3.14.3. MINIMUM

Under any model we recommend the development of alternative delivery for materials that can be studied away from the station and crew and during time the member is away from work. Some of these methods would include video, cable, and Internet course delivery. There are a variety of vendors that market products to cover the materials and provide grading, tutorial assistance, and record keeping. Training reports need to be centralized and training schedules should be developed based on analysis of operations and needs.

An EMS training section will be incorporated under the training chief. This section should have personnel that are capable of conducting continuing education programs for certified providers. Staffing should be in place to allow for training up to the cardiac technician level in accordance with the Virginia Division of Emergency Medical Services. Training will be available at basic and advanced levels during day and night hours to allow for more personnel to be trained as emergency medical services providers.

Continuing education will be available at the training academy and all County personnel will be able to maintain their medical skills and continuing education at no cost to the provider. The provision of continuing education should be the major focus of this section.

3.14.3.1. FINANCIAL IMPLICATIONS

No additional fiscal resources required to maintain status quo.

The current system provides some training but it fails to develop any sense of unity, and may be a contributor to disparate capabilities among the volunteer agencies and even among the career staffs. Unified training and professional development would enhance interoperability and provide incentive for additional training and education. A professional development plan would provide all members, both career and volunteer, a chance to plan their careers as well as a benchmark for evaluating all agency members.

3.14.4. RECOMMENDATION FOR TRAINING SERVICE LEVEL

EMSSTAR recommends: **"High"**

Rationale:

Integration of services will have its costs. Implementation and growing a changing culture can best be done by starting at initial entry and ensuring that competent training is conducted and all personnel are imbued with a sense that an integrated system is workable and is the best option for the County given its history and other conditions. Quality services are built upon preparation, and preparation for efficient delivery of fire/EMS services is predicated upon technical skills, confidence, and competent leadership. All of these are founded by training.

A well-founded fire and EMS training program will have long reaching impacts. When personnel are recruited as volunteers, it is imperative that they be able to enter a quality training program. Should programs not be available, volunteers will typically leave the service. This places a strain on the system and requires that additional effort be placed into recruiting more volunteers. Essentially, this becomes a vicious cycle with no gain in trained emergency responders. Likewise, when career personnel are added to the complement, it is imperative to have a recruit school available prior to assigning personnel to stations. The recommended level of service will give adequate staff to effectively train all new volunteer and career personnel in a timely manner. Once personnel are trained, it is critical that they remain proficient in a wide variety of motor and attentive skills. This model will allow for an aggressive continuing education program that will assure that personnel have the latest training in a wide variety of subjects that are relevant to providing quality emergency services.

The last critical part of this level of service is the EMS training function. Given that almost 80% of the workload is medical responses, EMS training is critical to the ongoing success of the system. This level will allow the Department to control the basic and advance life support training programs that Department personnel receive. By conducting all training in-house, the Department will be able to have a comprehensive record of the training for the majority of the providers. Secondly, the Department will be able to control the quality of the instruction and assure that personnel have the level of proficiency that is required in Loudoun County. The continuing medical education component will reduce the stress on providers and give them a guaranteed method to receive their required training hours without traveling to other localities. Medical direction will be involved in the clinical component of all training programs. This level of service dictates that a highly qualified person manages the advanced life support training function. This will provide a measure of quality assurance and give the position additional credibility when dealing with the local medical community.

The *Agenda for the Future* guides the process for various aspects of pre-hospital care. In the section on Educational Systems an important aspect of education states, "Higher level EMS education programs are affiliated with academic institutions." In order to accomplish this task, providers of EMS education should seek to establish relationships with academic institutions (e.g., colleges, universities, and academic centers.) In addition, it points out that accreditation will assist in making the program stronger.

3.15. WATER SUPPLY SERVICE LEVELS

This attribute addresses the delivery of fire suppression water supplies throughout Loudoun County. It considers the variety of water sources currently available, those under planning and development, and demands that are likely for the next decades. In general terms, fire suppression water supplies come in three classes. These are pressurized and static water sources and shuttled water supplies.

Generally, fire hydrants are the most common source for pressurized water. Hydrants are connected to water mains that in turn are connected to huge pumps or elevated storage tanks that provide adequate head pressures to move water from its stored point or source, through the maze of piping, to the hydrant outlet into the pumper through a variety of fire hoses, out of the pump into the attack fire hoses, through a nozzle or other discharge device, and onto the fire. In most cases this is the most desired type of water source for firefighting because it is quickly connected to, requires no priming, is easily used, and tends to be extremely reliable when properly maintained. The downside to hydrant systems is that the supply piping is often undersized in an attempt by a builder to achieve "false" economy. Another downside is that these systems require maintenance and they are costly to build and operate.

Static systems on the other hand allow a pumper apparatus to get close to the water source (or attached dry-piping), connect suction hoses, draft water from a source, and pump that water to the discharge nozzle or other pumper where it is needed. Drafting requires better-maintained pumps, better-trained operators, and access to static water sources that are available in all types of weather and drought/flood conditions. Drafting causes the pump and engine to work harder to provide water flows equal to that from hydrants.

Water shuttles provide another method of delivery of firefighting water supplies to the fire scene. Well done, shuttle operations are analogous to a complex orchestral piece, with each player performing a small part in exact time. Water carrying apparatus shuttle water from one of the two sources described above to a collecting point where they discharge water into another truck or a catch basin that the attack pumper is drafting out of. Essentially, the shuttle pumpers/tankers are providing enough water to allow the attack pumper to fight the fire from its own water tank and a folding tank that supplements the initial water supply and provides an easy drop off point for the shuttling units. Done well, the initial attack is done from the attack pumper's water tank as the driver sets up a folding tank for supplemental water. Before he exhausts his water supply a second pumper/tanker has filled the folding tank with its water and is en route to refill and shuttle additional tank loads as needed. The number of shuttle pumper/tankers depends on the size, required fire flows, and duration of the call; the water carry capacity of the pumper/tankers; the distance to the water source from the fire; road and turn-around capacity; the skill of the water supply officer in orchestrating the operation; and the training of the personnel involved. Usually when shuttling from a draft source, it requires four pumper/tankers to maintain a modest water flow. That allows one to stay at draft, one to attack the fire, and two shuttling back and forth with water from the draft pumper/tanker to the attack pumper/tanker. If the water source is a hydrant, then the minimum number is three.

The Department uses all three of these systems to successfully deliver fire protection services throughout the County. All of the stations use tank water for initial attack and where available (primarily in the eastern end of the County) choose to utilize fire hydrants. In the balance of the

County, except for the incorporated areas that have a water system with hydrants, the fire units depend on a mixture of drafting and shuttle operations. Most fires are controlled with the initial attack resources and extensive shuttle operations are not usually necessary. However, with development of the rural and western areas of Loudoun County, it is likely that ultimately larger fires will require more reliance on the draft/shuttle system.

The charter of the water authority proscribes planning outside their service area. Without expanding their authority it is unlikely that water services will be extended further than areas presently covered in the plan, therefore improvement of the fire services water supply throughout the rural and western districts is not anticipated, though proposed in “high” service level recommendations.

3.15.1. HIGH

Loudoun County shall plan and extend water services for firefighting throughout the County, except in those areas where adequate services are provided by other chartered authorities. Hydrants shall be located to ensure they are spaced to allow reasonable laying distances, not to exceed 600’ nor be spaced more than 1000’ apart in residential areas. Commercial hydrant spacing shall be designed to ensure hose laying distances not to exceed 350’ with hydrants spaced no more than 700’ apart (American Water Works Association-AWWA-M50, Insurance Services Office(ISO)). All units carry Large Diameter Hose (LDH). Hydrants will provide adequate flow to meet acceptable flow requirements (Underwriters, Iowa State, NFPA) and should otherwise provide adequate reliability and service.

Loudoun County Water Authority in conjunction with the Department will establish minimum Fire Flow requirements for development within the community. Minimum system flow requirements shall be based on occupancy type (residential vs. commercial vs. industrial). Minimum system design shall be capable of delivering 1000 gpm with a residual pressure of 20 psi as a basis for residential fire protection. System design shall take into consideration fire flow requirements in addition to maximum daily demand (AWWA).

Fire Companies will provide flow testing and maintain the hydrants within their primary fire district. The flow data should be provided to the Department water supply officer. The data will be placed on the Department’s data base for fire hydrants/water supply and that information will be provided all fire companies and units and will be incorporated into pre-incident plans.

The County will establish the position of Water Supply Officer (WSO). This may be a primary or additional duty with a career or volunteer officer. The WSO should have operational authority and rank necessary to ensure compliance with planning requirements and rank appropriate to direct water use and application at major alarms. The WSO shall have the authority and charge to liaison with other fire and water supply agencies and should be the conduit for water issues between the water authority, other water agencies and corporate water systems, and the Department. The WSO shall train assistants that will act in his/her stead when the WSO is unavailable for a major incident. Like the WSO, the assistants shall have the authority and rank necessary to ensure plans and maintenance are performed, records are accurate and properly reported and shared, and water is utilized to maximum advantage at major incidents. Assistants may be career or volunteer personnel and may be non-combat or operations staff members. The criteria for these positions is ability to manage the water

planning programs and the ability to orchestrate sophisticated water supply operations and an excellent understanding of the principles of hydraulics. Ideally at least one assistant will be available for response in each district.

The WSO shall ensure that the emergency communications system operators are informed regarding all water system data so at they may retransmit water supply data to fire units in the field.

The WSO shall serve as the coordinator for establishing SOPs regarding water supply, water delivery, drafting, shuttle operations, and all equipment regarding water pumping and delivery, and fittings. All agencies will use on standardized fittings, policies, and procedures.

3.15.1.1. FINANCIAL IMPLICATIONS

The financial and political costs are extremely high for this option. Extending the water authority charter may not be possible at this time and competing water agencies are unlikely to surrender planning authority in any future market area. Based on required road bores, pipe type, bridging required, soil conditions, and other underdetermined facts, 10" water line costs between $125,000 - $150,000 per mile to install. Fixtures, larger sized lines, unanticipated problems and a higher regional construction factor will make these costs higher in the next few years. Smaller lines will be a little cheaper, but not much. The WSO is a full-time position calculated at $80,000 with support and benefits. The costs of the high option are prohibitive and fraught with political consequences. Water is only part, albeit an important part, of the fire protection system. Without quick response of adequate numbers of properly trained and equipped firefighters, a piped water system offers little advantage to outweigh the costs of infrastructure development.

3.15.2. AVERAGE

This option envisions continued primary reliance on a mixture of hydrants, drafting sites and tank water for fire operations. It emphasizes the continuance of the draft site inventory and development project currently underway by the County.

Loudoun County should plan and extend water services for firefighting throughout the County, except in those areas where adequate services are provided by other chartered authorities. Hydrants should be located to ensure they are spaced to allow reasonable laying distances, not to exceed 500', with hydrants spaced no more than 1000' apart in residential areas. Commercial hydrant spacing should be designed to ensure hose laying distances not to exceed 350' with hydrants spaced no more than 700' apart. Hydrants should provide adequate flow to meet acceptable flow requirements (Underwriters, Iowa State, NFPA) and should otherwise provide adequate reliability and service (AWWA, ISO).

Loudoun County Water Authority in conjunction with the Department should establish minimum Fire Flow requirements for development within the community. Minimum system flow requirements should be based on occupancy type (residential vs. commercial vs. industrial). Minimum system design should be capable of delivering 1000 gpm with a residual pressure of 20 psi as a basis for residential fire protection. System design should take into consideration fire flow requirements in addition to maximum daily demand (AWWA).

Fire Companies will provide flow testing and maintain the hydrants within their primary fire district. The flow data should be provided to the Department water supply officer. The data will be placed on the Department's data base for fire hydrants/water supply and that information will be provided all fire companies and units and will be incorporated into pre-incident plans.

The County will establish the position of Water Supply Officer. This may be a primary or additional duty with a career or volunteer officer. The WSO should have operational authority and rank necessary to ensure compliance with planning requirements and rank appropriate to direct water use and application at major alarms. The WSO shall have the authority and charge to liaison with other fire and water supply agencies and should be the conduit for water issues between the Water Authority, other water agencies and corporate water systems, and the Department. The WSO shall train assistants that will act in his/her stead when the WSO is unavailable for a major incident. Like the WSO, the assistants shall have the authority and rank necessary to ensure plans and maintenance are performed, records are accurate and properly reported and shared, and water is utilized to maximum advantage at major incidents. Assistants may be career or volunteer personnel and may be non-combat or operations staff members. The criteria for these positions is ability to manage the water planning programs and the ability to orchestrate sophisticated water supply operations and an excellent understanding of the principles of hydraulics. Ideally at least one assistant will be available for response in each district.

The WSO shall ensure that the emergency communications system operators are informed regarding all water system data so that they may retransmit water supply data to fire units in the field.

The County currently has underway a major project identifying and maintaining or improving drafting sites. There is also a plan underway to add to existing sites so that there are year round accessible drafting sites within reasonable distances of all structures. Each fire company should be required to test and maintain each drafting site in its district. Just like with hydrants, the data needs to be shared with all fire companies in the County and provided to the dispatch center so that communicators can radio information to units in the field. The sharing of this data and auditing company maintenance of drafting sites shall be the duty of the WSO and staff.

The WSO shall serve as the coordinator for establishing SOPs regarding water supply, water delivery, capacities, drafting, shuttle operations, all equipment regarding water pumping and delivery, and fittings. All agencies will reach agreement on standardized fittings, policies, and procedures.

County fire units should universally utilize large diameter hose to ensure the most efficient use of water resources. Also, the Department should test and consider adopting standardized additives to maximize water effectiveness as well as incorporate foam (or other supplements) or CAF systems into current and future fire pumpers/ tankers.

There is a need for a detailed response plan, particularly in non-hydrant areas to ensure that adequate and appropriate units respond to allow maintenance of shuttle water flows based on pre-determined fire flow requirements at each target hazard. In non-hydrant areas a minimum of four pumper/tankers are necessary to ensure modest fire flows with a three mile shuttle (1.5 miles fire to draft point). If the required fire flows are planned above 250 gpm additional units may be required. In any case, all companies, even those from hydranted areas, are mandated to maintain proficiency in shuttle and drafting operations.

3.15.2.1. FINANCIAL IMPLICATIONS

The additional costs are regarding the WSO ($80,000 wages, benefits, and support-may be assigned as an additional duty) and the standardization of water equipment and the addition of foam and large diameter hose where required. This should be done through attrition and incorporated into the capital equipment plan and will have little fiscal impact. This proposed course of action builds upon current programs and plans. It maximizes activities and a procedure already utilized and simply represents a cost-effective yet incremental improvement with better coordination. The use of the WSO and assistants is yet another opportunity to bridge gaps between career and volunteer members and is an excellent opportunity to utilize competent and qualified members who cannot function in operations positions.

3.15.3. MINIMUM

Minimum services would be the continuation of drafting site planning and development, the use of the Water Authority only as currently configured, and no consideration for staffing or utilization of a WSO.

3.15.3.1. FINANCIAL IMPLICATIONS

There are no additional financial implications associated with this option. The problem that exists now with the draft site system is that few are maintained or utilized, information is not shared, and standard practices are neither well established nor tested. While the team thinks it is possible to continue to meander through fires under these circumstances, it neither provides the best possible cost effective delivery of fire protection nor does it reflect favorably upon the generally high professionalism of the agency or its members.

3.15.4. RECOMMENDATION FOR WATER SUPPLY SERVICE LEVEL

EMSSTAR recommends: "**Average**"

Rationale:

Water supplies are an integral aspect of community development. The average service level recommended recognizes that future water system design improvements are not only based on potable consumption demands but required flows as an essential component of water system delivery capabilities. These baseline parameters are applied to system expansion efforts undertaken by developers and are utilized in site plan reviews and project approvals. Rather than a singular focus for water system design, the institution of minimum design criteria utilizing required fire flows for different types of development recognizes the plural role of the water system both in terms of potable water and adequacy for firefighting requirements.

Community development is the principal driver in water system expansion. As the community grows and the water system expands, reliance on traditional methods of water supply for firefighting will diminish. Appropriate system design criteria taking into consideration firefighting needs will reduce reliance on draft sources as well tanker shuttle operations. As a result, infrastructure requirements with respect to the types of firefighting vehicles needed by the Department will change, reducing the need for alternate water supply delivery vehicles. This reduction will yield standardization in fleet design and utilization creating both cost efficiencies and improvement in firefighting capabilities.

3.16. EMERGENCY MANAGEMENT SERVICE LEVELS

This attribute addresses the function of Emergency Management in Loudoun County. Emergency Management has evolved during the last forty years from a singular mission (community preparation for radiological threat) to one that encompasses all aspects of emergency risk and disaster

preparedness. Loudoun County's emergency management program is charged under Title 44 of the Virginia Code with the following responsibilities; preparedness, response, recovery and mitigation. Each of these elements requires the discharge of specific duties and functions. A cohesive emergency management program minimizes the potential impact of disasters including the loss of life and property.

3.16.1. HIGH

The Loudoun County Board of Supervisors appoints an Emergency Management Director/Coordinator whose primary responsibility is the coordination of the emergency management functions. Adequate staff is provided to assist the Director in the discharge of emergency management responsibilities. In addition to the Director, staff support includes clerical and operational personnel.

A functional, adequate and dedicated Emergency Operation Center exists to support the coordination of emergency service and governmental functions during a declared local emergency and provides an environment conducive to conduct these activities. The center is capable of operating independently in the event of utility failures. Communication and information capabilities exist to support center and emergency operations.

The Emergency Management Agency functions under the Integrated Emergency Management System. The EMA program is functionally tested on an annual basis utilizing an established emergency operations plan that delineates functional responsibility for all the departments and agencies under the auspices of the Loudoun County Board of Supervisors during a disaster. Specific disaster response plans have been developed for the community to address emergency events to which the community is highly susceptible. These plans cover natural disasters including floods and flash flooding, tornadoes, hurricanes and winter weather hazards. Technological emergencies such as hazardous material incidents, commercial passenger aircraft accidents, major utility failures/outages and terrorism incidents should also be appropriately planned for.

The EMA program maintains a comprehensive database of critical facilities and is capable of providing emergency responders with current and valid facility risk information including Title II and III compliance reports. Material Safety Data Sheets are routinely distributed to properly inform emergency responders of potential chemical risks within their first due response district. Essential resources are catalogued and a list of these resources is available to emergency responders. All 112R- Facilities are catalogued and Risk Management Plans for worst-case scenarios have been approved. In conjunction with the Loudoun County Board of Education and the Sheriff's Department, a School Crisis Management Plan has been established.

The EMA Program has an established Local Emergency Planning Committee with appropriate representation from critical groups including public safety agencies, education, medical, media, government and community representatives to assist the agency in program planning, community education, mitigation, response and recovery.

A functional warning system is in place to alert the population to high-risk events.

A system of sheltering displaced citizens is in effect including facilities capable of supporting displaced community members. This system should be comprehensive in nature and include essential support services such as feeding, medical care and communication.

A plan has been developed that insures the continuity of government and its functions. Inclusive within the plan is the decision-making hierarchy and authority. Appropriate local ordinances are in place to control disaster related cleanup and contractor services, institution of pricing controls and other emergency measures.

3.16.1.1. FINANCIAL IMPLICATIONS

EMA Director/Coordinator $80,000

Operations Position $62,000

Clerical Position $38,000

Emergency Operations Center $1,000,000

3.16.2. AVERAGE

The Loudoun County Board of Supervisors appoints an Emergency Management Director/Coordinator whose primary responsibility is the coordination of the emergency management functions. Adequate staff is provided to assist the Director in the discharge of emergency management responsibilities. In addition to the Director, staff includes a clerical position.

A functional and adequate Emergency Operation Center exists to support the coordination of emergency service and governmental functions during a declared local emergency and provides an environment conducive to conduct these activities. The center is capable of operating independently in the event of utility failures. Communication and information capabilities exist to support center and emergency operations.

The EMA program is functionally tested on an annual basis utilizing an established emergency operations plan that delineates functional responsibility for all the departments and agencies under the auspices of the Loudoun County Board of Supervisors during a disaster. Specific disaster response plans have been developed for the community to address emergency events to which the community is highly susceptible. These plans cover natural disasters including floods and flash flooding, tornadoes, hurricanes and winter weather hazards. Technological emergencies such as hazardous material incidents, commercial passenger aircraft accidents, major utility failures/outages and terrorism incidents should also be appropriately planned for.

A system of sheltering displaced citizens is in effect including facilities capable of supporting displaced community members. This system should be comprehensive in nature and include essential support services such as feeding, medical care and communication.

3.16.2.1. FINANCIAL IMPLICATIONS

EMA Director/Coordinator $80,000

Operation Position $62,200

Clerical Position $38,000

Emergency Operations Center $100,000

3.16.3. MINIMUM

The Loudoun County Board of Supervisors appoints an Emergency Management Coordinator whose responsibility is the coordination of the emergency management functions in addition to other duties and responsibilities.

An Emergency Operation Center exists to support the coordination of emergency service and governmental functions during a declared local emergency and provides an environment conducive to conduct these activities. Communication and information capabilities exist to support center and emergency operations.

The EMA program is functionally tested on an annual basis utilizing an established emergency operations plan that delineates functional responsibility for all the departments and agencies under the auspices of the Loudoun County Board of Supervisors during a disaster.

A system of sheltering displaced citizens is in effect including facilities capable of supporting displaced community members. This system should be comprehensive in nature and include essential support services such as feeding, medical care and communication.

3.16.3.1. FINANCIAL IMPLICATIONS

Emergency Operations Center $50,000

3.16.4. RECOMMENDATION FOR EMERGENCY MANAGEMENT SERVICE LEVEL

EMMSTAR recommends: Phased in approach to a "**High"**

Rationale:

Loudoun County's location within the Metropolitan Washington, D.C. Metropolitan Statistical Area situates it in one of the twentieth largest metropolitan areas in the United States. Its proximity to Dulles International Airport and the presence of major transportation arteries through the community places the community in a position of vulnerability to man-made disasters including hazardous materials incidents, downed commercial aircraft, terrorism and other large scale incidents that can seriously impact the health and welfare of constituents. In addition, Loudoun County has withstood its share of severe weather related events including tornadoes, hurricanes and severe winter weather. During the last fifty years, Virginia has averaged 7 tornadoes per year including an F2 tornado that struck the southeast portion of Loudoun County in 1996. Since 1992, there have been 14 Presidential Disaster Declarations issued throughout the Commonwealth of Virginia for a variety of weather related events. Loudoun County has not been isolated from these declarations.

A comprehensive emergency management program is essential to local governments efforts to prepare for, respond to and recover from a variety of disasters that have the ability to significantly impact the community. State and Federal assistance including the ability to recover costs associated with disaster response and recovery can only be obtained through a formal and functional local EMA program. With the continued growth and expected influx over the next twenty years of residents and businesses, Loudoun County must be adequately prepared to respond to any disaster in a comprehensive and coordinated manner.

3.16.4.1. SPECIALIZED SERVICES

Specialized services further address the attribute of emergency management. Periodically, emergencies occur that are beyond the capabilities of the basic firefighter or emergency medical technician. Even thought these incidents are very low frequency, they have an exceptionally high risk for the victim and the rescuers. Further complicating these incidents is that mitigation of the emergency requires extensive specialized training and expensive equipment. Given the low frequency of these incidents, it is not cost effective to have the necessary equipment or staff to handle every type of emergency that may strike Loudoun County. This section specifically addresses the areas of: Mass Casualty Incidents, Hazardous Materials Incidents, Search and Rescue, and Terrorism/Weapons of Mass Destruction.

3.16.4.1.1. HIGH

A high level of service would reflect highly specialized teams that are each trained and equipped to handle one type of the emergency incidents listed above. Personnel would receive initial training and ongoing education in one of the four specialty areas. Special response vehicles would be in place,

strategically located throughout the County. An automatic dispatch protocol would be in place to automatically activate the respective team based on the information gathered from callers.

Quarterly drills are held to assure that personnel remain proficient in handling technical rescue responses. All fire and rescue personnel are trained to the first responder level in all four areas. A core group from each area of the County is trained to a higher level and serve as back-ups for the fully functional teams.

3.16.4.1.1.1. FINANCIAL IMPLICATIONS

Establishing technical response teams is expensive. Depending on the nature of the team, the cost can be from $100,000 up to $750,000 including a vehicle. A conservative estimate of this program would be approximately $1.2 million for four fully functional trained teams.

3.16.4.1.2. AVERAGE

This level of service would rely upon assistance from mutual aid localities for these services. All personnel are trained to the first responder level. A select team from each area of the County are trained in defensive techniques or to a level to be able to begin a response while waiting on mutual aid. Yearly drills are held with mutual aid localities to refresh members' skills in the various technical areas.

3.16.4.1.2.1. FINANCIAL IMPLICATIONS

The financial impact for this level will be centered around providing training for all personnel. Estimated cost for training is approximately $200,000 for 1000 fire and EMS providers to be trained to the first response level for four different disciplines.

3.16.4.1.3. MINIMUM

This level of service will rely on surrounding localities for all technical responses. A limited number of personnel are trained to the first response level in all four areas. Other personnel approach technical rescue scenes for size-up only and then protect the area until the trained teams arrive.

3.16.4.1.3.1. FINANCIAL IMPLICATIONS:

There is limited cost for training limited personnel in the four areas of specialized rescue. Estimated cost of $50,000.

3.16.4.1.4. RECOMMENDATION FOR SPECIALIZED SERVICES SERVICE LEVEL

EMSSTAR recommends: **"Average"**

Rationale:

The average level of service provides all emergency responders with basic information about specialized emergencies. Immediate action can be taken to recognize special rescue situations and appropriate defensive tactics can be applied. Agreements with local teams allow Loudoun County to utilize the expertise of other localities that have chosen to train and equip specialized response teams. In this level, the service is provided in the most effective and economical method.

3.16.4.2. EXTERNAL AGENCY RELATIONSHIPS

This attribute addresses the relationships between the Department and external agencies that have programs and or services that may be of value to Loudoun County. These services may range from regularly occurring emergency response assistance to predefined contractual relationships for specialized services and expertise not readily available or whose utilization occurs on an infrequent basis.

3.16.4.2.1. HIGH

The Department participates in a reciprocal relationship with neighboring jurisdictions and their emergency services programs through the use of automatic aid agreements. These agreements stipulate the simultaneous dispatch of personnel and apparatus to border areas where external jurisdiction response can reach specific targeted areas in the community quicker than intra-jurisdictional units. The agreements should provide sufficient detail regarding emergency scene operations including command and control, fiscal relationships and liability coverage issues. Joint training with participating entities should be defined and exercised routinely.

Mutual Aid Agreements are in force between Loudoun County and adjacent emergency service providers. Unlike Automatic Aid agreements, mutual aid agreements stipulate emergency response assistance to Loudoun County when internal resources have been exhausted. These agreements provide sufficient detail regarding emergency scene operations including command and control, fiscal relationships and liability coverage issues.

The Department has developed predefined relationships and agreements with external agencies for specific isolated emergency service demands. These situations may require the activation for specialized rescue teams or units and can include events such as confined-space rescue, high angle rescue, hazardous material incidents, urban search and rescue, mass casualty and trench rescue, dive rescue and recovery. Other assistance may include specialized arson investigative services such as those that can be obtained through Federal ATF Task Forces.

All external agreements should provide sufficient detail regarding emergency scene operations including command and control, fiscal relationships and liability coverage issues.

3.16.4.2.1.1. FINANCIAL IMPLICATIONS

The actual implementation of mutual response agreements have little direct expenses. The premise of this system is that both localities benefit through the mutual exchange of personnel and equipment. This is predicated on the fact that the number of responses into the other jurisdiction will be equal over a period of time. In fact, the designation of response areas in some instances are reflective of an even workload between the two jurisdictions. The primary direct cost of this level is the provision of a seamless dispatch system and radio communications equipment. All vehicles that respond on emergencies should have portable radios capable of talking to the other jurisdiction. If radios are not currently able to operate on the surrounding localities channels, this cost will equate to approximately $2,500 per radio, this will equate to approximately $250,000 for 25 vehicles that will respond on a regular basis into surrounding localities. Obviously, the cost will increase should the County elect to equip more vehicles with radios.

Additional direct cost arises in providing training to all personnel to assure compatible command and response systems. This cost is estimated at $25,000.

3.16.4.2.2. AVERAGE

The Department participates in a reciprocal relationship with neighboring jurisdictions and their emergency services programs through the use of automatic aid agreements. These agreements stipulate the simultaneous dispatch of personnel and apparatus to border areas where external jurisdiction response can reach specific targeted areas in the community quicker than intra-jurisdictional units. The agreements should provide sufficient detail regarding emergency scene operations including command and control, fiscal relationships and liability coverage issues. Joint training with participating entities should be defined and exercised routinely.

Mutual Aid Agreements are in force between the Department and adjacent emergency service providers. Unlike Automatic Aid agreements, mutual aid agreements stipulate emergency response assistance to Loudoun County when internal resources have been exhausted. These agreements provide sufficient detail regarding emergency scene operations including command and control, fiscal relationships and liability coverage issues.

The Department develops and utilizes internal expertise for specialized emergency services demands and non-routine emergency occurrences.

3.16.4.2.2.1. FINANCIAL IMPLICATIONS

The costs for this level are equivalent to the projected cost for the high.

3.16.4.2.3. MINIMUM

Mutual Aid Agreements are in force between the Department and adjacent emergency service providers. Unlike Automatic Aid agreements, mutual aid agreements stipulate emergency response assistance to Loudoun County when internal resources have been exhausted. These agreements provide sufficient detail regarding emergency scene operations including command and control, fiscal relationships and liability coverage issues.

The Department utilizes available internal resources for specialized emergency services demands and non-routine emergency occurrences.

3.16.4.2.3.1. FINANCIAL IMPLICATIONS

This service level can be implemented with little financial impact. Given the low number of incidents that this will be activated for, units can relay information through the 911 center. Further, if a designated mutual aid channel is in place, that channel could be used for this limited response. Training cost will be negligible under this level.

3.16.4.3. RECOMMENDATIONS FOR EXTERNAL AGENCY RELATIONSHIPS

EMSSTAR recommends: "**High**"

Rationale
Utilization of external resources in a reciprocal relationship is a cost effective method for achieving emergency response objectives without expending scarce fiscal resources for additional infrastructure and personnel in fringe areas of the community. In light of program recommendations (seamless countywide system) the Department is isolated from shifting jurisdictional boundaries as a result of annexation. This allows the agency to effectively plan for facility locations without the potential for facility obsolescence as a result of geopolitical changes. Having this capability provides the Department with the opportunity to have reciprocal emergency response relationships with neighboring departments.

Likewise, the Department's need for specialized services will increase with community growth. However, until such time as demand dictates an advanced service level capability, the Department should rely on existing external resources to provide it with these services

3.17. INTEGRATION SERVICE LEVELS

The integration of EMS within the health care delivery system is a relatively progressive concept. Traditionally, EMS systems have been about the business of responding once an emergency, illness

or injury, has occurred. The system isn't activated until after the damage has been done. Furthermore, the system's interest in the emergency condition lasts only long enough to transport the affected people to a hospital or to determine that no ambulance transport is necessary. Clearly, however, there has evolved a realization that the potential role of EMS in monitoring community health and in improving it can be so much more.

EMS workers enjoy access to the community that most other aspects of the public safety and health care delivery systems do not. They are entrenched in the community and are often among its most trusted members, especially in the case of volunteers, and are valued for their commitment and expertise. They are readily invited into peoples' homes and into other situations, without second thought. They often have the advantage of witnessing, first hand, the environments, circumstances or conditions, and the behavior that led to illness or injury. Thus, EMS personnel have the knowledge of the community and its members that is necessary to create health-promoting interventions. They have access to the community that is unparalleled, enabling them to monitor conditions and carry interventions to the appropriate target. What EMS too often does not have are partners in health care that can help maximize the potential of the system to use pre-existing resources to do better work.

There is now growing momentum across the United States to better integrate EMS with other components of the health care system. All of these components have the same goal, to improve community health. In most cases integration manifests as improved communication where there previously was none; collaboration to monitor a problem, develop a solution, or initiate a project; or delivery of specific care. Numerous EMS systems have developed relationships with social service agencies, enabling EMS personnel to make expedited referrals to programs for elder care, meals on wheels, and others. Some EMS systems have developed communication networks to advise patients' physicians when they have evaluated, but not transported, a person, so that appropriate follow-up of the condition occurs. EMS systems are developing programs so that they, themselves, follow-up with patients who they evaluated but did not transport and patients who are chronic users of the system. In this way the system is able to intervene on a routine basis, before an emergency occurs. Some innovative systems have implemented programs to monitor certain chronic conditions among select people in their communities. The hope is that early identification of deterioration or complication development will lead to earlier care and less morbidity. Others have collaborated with public health departments to enhance surveillance of certain problems, such as occupational injury, deliver important messages to community members, or provide preventative care, as in having EMS personnel provide influenza vaccines.

The common feature of all attempts to better integrate EMS with the other aspects of the health care system is communication. It is development of processes for exchange of information and ideas among agencies and organizations whose missions' overlap, but whose paths do not otherwise cross.

3.17.1. HIGH

The Department, with the assistance of the Board of Supervisors, implements and maintains a Loudoun County Integrated Community Health Task Force. Its purpose is to develop lines of communication among the County's interests in the health care system, including the EMS system, social service agencies, public health entities, medical organizations, health care insurers, and others. The goal is to create projects and programs that identify specific community health needs and

interventions aimed at addressing them. The Department plays varying active roles in these efforts, collecting data, sharing information, providing surveillance, finding cases, making referrals, following up with its patients, and/or delivering targeted interventions. The EMS system follows-up all its cases involving patients who are not transported, and routinely transmits a record of such cases to patients' primary health care provider when that information is known.

3.17.1.1. FINANCIAL IMPLICATIONS

Integrated Health Task Force $10,000

Equivalent paramedic staff time (1 FTE) $60,000

No other direct costs

3.17.2. AVERAGE

The Department leadership develops lines of communication among the County's interests in the health care system, including, social service agencies, public health entities, medical organizations, health care insurers, and others. They attempt to identify opportunities for program development to identify specific community health needs and interventions aimed at addressing them. The Department makes itself available to play varying roles in these efforts, possibly including collecting data, sharing information, providing surveillance, finding cases, making referrals, following up with its patients, and/or delivering targeted interventions. The principal contrast from the high service level is in the lack of a formal forum for communication to occur, the commitment of staff time to facilitate program development, and the EMS system's follow-up of its patients who are not transported.

3.17.2.1. FINANCIAL IMPLICATIONS

No direct costs

3.17.3. MINIMUM

The Department leadership is receptive to other health care entities when they seek the system's involvement in collaborative projects to monitor or improve community health. The Department makes itself available to play varying roles in these efforts, possibly including collecting data, sharing information, providing surveillance, finding cases, making referrals, following up with its patients, and/or delivering targeted interventions. The principal contrast from the average service level is the commitment of the Department to be proactive in establishing lines of communication and identifying opportunities for collaboration.

3.17.3.1. FINANCIAL IMPLICATIONS

No direct costs

3.17.4. RECOMMENDATION FOR INTEGRATION SERVICE LEVEL

EMSSTAR recommends: "**High**"

Rationale:

Loudoun County is progressive and sophisticated. Its EMS system should be as well. The high service level connotes an EMS system that is proactive in affecting the health of its community, which is the system's ultimate goal. The justification of resources committed to the Department is much more sound when those resources are being used to their full potential and in a manner consistent with there intended purpose. As noted above, there are numerous opportunities within Loudoun County, or any other community, to better integrate EMS with other entities in the health care system. Efforts are ongoing around the country to capitalize on these opportunities as they can be identified and pursued without excessive costs. At moderate marginal cost, the potential can be created for the Department to affect the community and the health of its members to a far greater extent by being more than just a means to the hospital after an emergency has occurred.